

Origins and Endings
Human Genesis and Formation, Archaism and
the State, Capital and Planetary Crisis

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Contents

Prologue

Capitalism and the Problem of Nature Domination (2012)

Origins

Capital and the Crisis in Nature (2010)

The Materialist Dialectic: Why the Study of Human Origins is Necessary to the Critique of Science and Inseparably that of Capital (2011, 2014)

Preface

Introduction

The Origins of Man

The Appearance of "Spirit"

Afterword: Archaic Communities and the Origins of Agriculture (2009, 2011) *with an Annex on the State* (2000)

Appendix: The Critique of Reductionism in the Science of Man

Short Texts on Pandemic Disease and Capital (March 2009; April, August 2020), *Renewed Imperialist World War* (November 2008) and *Consequences of Abruptly Changing Climate* (July 2008)

Endings

Capitalism and the Domination of Nature: Earthly Premises of All Living Existence, Capitalist Technologies, the Modern Science of Nature and the Movement of Capital (May, Dec 2010; Aug 2012, Jul 2015, Mar 2018)

Introduction: Capitalist Criminality

Part I: Capital and the Crisis in Nature (Continued)

Part II: Capital and the Crisis in Society (in Nature)

Part III: Science, Technology and Capital

Part IV: Remarks on the Reconstruction of the Geological Past

Conclusion: Climate Change, the Origins of "Man" and Ice Ages

Summation and Perspective

Why the Study of Human Origins is Indispensable to the Critique of Science and Inseparably that of Capital (March 2012)

Epilogue (Nov 2014)

Images:

Homo Middens (1992). Vicki Barnes

A Scene from the Insect Apocalypse (Sept 2018)

Inside Back Page

Home Page, Will Barnes' Website

<https://www.critiqueofcapital.com>

Mein Flügel ist zum Schwung bereit
Ich kehrte gern zurück,
denn blieb ich auch lebendige Zeit
ich hätte wenig Glück.

Gerhard Scholem,
"Gruss vom Angelus"

Klee painting named "Angelus Novus" shows an angel looking as though he is about to move away from something he is fixedly contemplating. His eyes are staring, his mouth is open, his wings are spread. This is how one pictures the angel of history. His face is turned toward the past. Where we perceive a chain of events, he sees one single catastrophe which keeps piling wreckage upon wreckage and hurls it in front of his feet. The angel would like to stay, awaken the dead, and make whole what has been smashed. But a storm is blowing from Paradise; it has got caught in his wings with such violence that the angel can no longer close them. This storm irresistibly propels him into the future to which his back is turned, while the pile of debris before him grows skyward. This storm is what we call progress.

The "Angel of History" from Walter Benjamin's
"Theses on the Philosophy of History" (Thesis IX)

Prologue

Capitalism and the Problem of Nature Domination

The Immediate Problem: "Extreme Weather"

"Extreme weather" is a mystification that emanates from capital's spectacle: Weather exists at the extremes precisely because we are living in historical time in an early or onset period of a transition between the two modes of climate that have geologically characterized the last 600-700 million to a billion years of Earth history. It hasn't!... It is likely now that winter 2010-2011 marked a *turning point in the abruptly changing climate – the end of the initial phase of transition*, since it is more and more clear we are *no longer* living in and through the onset of climate change characterized by the sporadic appearance of weather at its extremes, but a *new phase characterized by the regular appearance of weather at its extremes together with an ongoing heightening and intensification of these extremes*.² The last 10,000 years (that is, over the extent of the last interglacial in which we live) have witnessed perhaps the most stable climate period in any in Earth's history that has been reconstructed.³ This stability has most visibly and noticeably characterized by well-defined regional climatic regimes (e.g., mild summers with cold winters characterized of middle latitude temperate zones), seasonal temperature ranges within narrow limits, well defined periods of seasonal change, predictable because constantly

¹ *There is no equivalence between the geological past and the living present, an equivalence which would justify the assertion that climate regimes occur cyclically in Earth history. This is why: (a) the mechanism of mass extinctions which generated the two pertinent cases of planetary warming, starting from flood basalts, is entirely different from that today which begins with and is sustained by industrial emissions. To boot, the role of volcanism in Earth history has dramatically decline over the last 200 million years; (b) the two hothouse Earth "events" giving rise to mass extinction ranged over two to twelve million years in developing, unlike today which is occurring not in geological, not even in historical, time but within a single human lifetime; (c) while Earth history does not unfold cyclically over millions of years, there is, though, overall direction in atmospheric carbon dioxide levels and thus, in global average temperature, notwithstanding CO₂ spikes (methane-hydrogen sulfate mass extinctions), and thus as overall temperature has varied. That tendential direction is downward. It is a product of weathering. As silicate and carbonate rock (e.g., quartz, granite) are exposed to air and precipitation, inorganic carbon is chemically released; the breakdown products run off and are carried by waterways out to the sea and eventually accumulated in the form of limestone which is sequestered at the ocean bottoms. Over large spans of geological time, the result is a drawdown of atmospheric carbonic dioxide. Thus, at the onset of Cambrian (circa 550 mya), global carbon dioxide levels were at roughly 5500 ppm; at the "moment" of the late Devonian extinction (circa 360 mya), there were a little less than 4000 ppm; by the time of the Permian extinction (249 mya) these levels were just in excess of 3000 ppm; during the Jurassic-Cretaceous boundary (circa 150 mya) they had fallen to just under 2000 ppm; at the Paleocene-Eocene boundary (55 mya) these levels had dipped about 800 ppm. For the next 53 million years those atmospheric CO₂ levels continued to fall, having dropped enough to trigger cosmological determination (the orbital relation of the Earth to the sun) and bring on a glaciation... The overall tendency over 550 million years of Earth history, then, has been atmospheric carbon dioxide level decline; (d) this is one more reason why the current warming is not cyclical: It is extraordinarily anomalous and cannot be explained by some "natural cycle." Recall, during glacials over the past million years atmospheric carbon dioxide levels has never exceeded 200 ppm, while during interglacials that figure rose as high as 300 ppm; and (e) not only that, the ice fields (on the elevated regions of northern Labrador and Elsmore Island) where glaciation forming the North American ice cap begins should have already begun to thicken; instead they are disappearing, melting away ... Contemporary warming can only be explained from the emissions arising from capitalist development.*

² The first of these two became increasingly noticeable after September 2012. It was the northernmost jet stream which has begun to weaken, thus to meander forming ridges and troughs, and with them blocking patterns in which extremes of heat and drought, and low pressures systems capable of dumping torrential falls, predominant. This development has markedly increased already ongoing increases in the severity of weather at its extremes. A second fateful phase has appeared and become manifest since spring 2013. This is the accelerated warming in the Arctic. This warming is now self-sustaining and features seemingly countless feedbacks (e.g., warm waters flowing into the Arctic from the Pacific by way of the Bering Sea, McKenzie River Delta, the Atlantic Gulf Stream in its various major branches; declining albedo; soot from Scandinavian, Siberian and Canadian wildfires lodging on the Greenland ice cap; earthquakes along the Gakkel Ridge which are releasing methane hydrates from beneath the seafloor, clathrate dissociation along the East Siberian Arctic Shelf, methane release from melting permafrost above 60° N latitude in the North Hemisphere; etc, etc). *The self-sustaining, self-amplifying character of warming in the Arctic signals that climate change has broken from its mooring in capitalist development and has now achieved autonomy, in other words, full-scale planetary climate transformation and all this portends it is now irreversible.*

³ William J. Burroughs. *Climate Change in Prehistory: The End of the Reign of Chaos*. Cambridge (Eng.), 2005. 13, 102. Over this period, the average annual surface temperature of the Earth has not varied more than one degree Celsius, a half degree up or down. However, since 1765 temperature has already rise 1.3° Celsius (the IPCC masks this by using the year 1900 as its baseline). Remove sulfate aerosols from the atmosphere and that rise is over 2° Celsius. In the Arctic where an icecap is decisive for ensuring the stability of that 1° C up or down range, temperatures have risen 3-5 times the global average, especially in the winter (with days that have witnessed +15° - 20° C anomalies).

recurring weather patterns and modalities of weather that itself occurs within narrow limits.

Today, though, patterns of weather formed over and dominating the interglacial we live in, such as the regularity of seasons each with its own predictable structure, are disappearing. Instead, weather patterns that have existed over millennia are vanishing, and based on these vanishing patterns "the weather" itself is losing its predictability and its *stability*. Similarly, climatic "regimes" characteristic of specific geographical regions (e.g., a low latitude temperate region with hot summers and mild winters) are losing their defining features as these regimes become much more "elastic." Destabilized, under conditions of capitalistically determined, global warming induced climate change, the occurrence of weather *at its extremes* is becoming more and more frequent (increased intensity of hurricanes in the Gulf and El Nino effects, increased frequency of drought and wildfires, and of "hundred year" floods say in the US Midwest, etc.)... those extremes are not fixed but their limits or boundaries are becoming more and more stretched... because warming more and more degrades the temperature differential between the tropics and in the Arctic, thereby slowing and thus increasing the meridional movement (i.e., meandering) of the northern jet stream, producing troughs and ridges, transporting more heat to the Arctic, and increasing both the dryness of existing arid regions (which actually tend to expand) and exacerbating atmospheric conditions along frontal boundaries and increasing moisture content in different atmospheric circulations fueling storms that produce extreme weather such as droughts, heavy rains generating flooding, landslides and mudslides, tornadic superstorms; extreme heat and extreme cold.⁴

The Mediate Problem

Instantiating its General Dimensions:

The Mississippi and Atchafalaya, the US Army Corps of Engineers and Capitalist Commerce

The crisis in nature has appeared before as part of geologically occurring processes in which the evolution of life is inextricably implicated. But today for the first time in the history of the Earth it is occurring historically, that is, it is occurring in highly compressed historical time (the period of a single human lifetime) as the outcome of societal developments or, far more adequately, as a consequence of the logic and movement of capital.

The crisis of nature as we experience it today is the result of that logic and movement which themselves begin from the bourgeois pursuit of accumulative practices, practices whose overall meaning and significance can be grasped historically in terms of the development of productive forces of society that necessarily devolves in the domination of nature, i.e., the practical-utilitarian (that is, technological) reduction of nature to a raw materials basin for capitalist commodity production.

We shall instantiate the futile results of this logic and movement as it presupposes and advances that domination...

Funded by the US Congress, the Army Corps of Engineers and, later, the Bureau of Land Reclamations, are the agencies of the state, institutions, that marshaled the expertise and mobilized manpower and machinery to create the infrastructural presuppositions of capitalist commerce both as an end in itself and as, among others, a means of achieving American national expansion and realizing American national power.

⁴Take, for instance, tropical storms.

Heat is a form of energy. Add enough heat to ice and you get a phase change from solid (ice) to liquid (water); add enough heat to water and you get another phase change from solid (water) to gas (water vapor). Remove the heat and the phase changes can be reversed. In adding heat, the energy it contains remains in the new phase but latently. Water vapor, what we've been calling atmospheric moisture, contains more heat (hence more latent energy) than liquid water. The oceans are the largest reservoir of heat on Earth. The more the atmosphere warms, the more water is evaporated from the oceans, the more latent energy is present and available for storms so that, for example, when a hurricane forming in the central Atlantic reaches the Gulf, already perhaps the warmest large body of water on Earth, additional water vapor in the atmosphere is additional fuel that enhances the size and intensity of the storm (fuel, just as in the opposite case extremely dry conditions in the underbrush of a forest provides fuel for a wildfire); or, again, as a large warm air mass containing copious amounts of water vapor pushes north from the Gulf and collides with a far cooler air mass from the North American high latitudes (middle reaches of Canada) pushed south by the jet stream, the storms produced along the line of their collision will be very powerful.

We can quantify this discussion: A single degree Celsius of global temperature rise increases the intensity, *planetary*, of the hydrological cycle by seven percent (7%). So if evaporation increases by 7%, not only does the rate of rainfall during storms increase by the same 7%, taken up into the atmosphere in latent form this moisture fuels more droughts and heatwaves. Estimated rises in temperatures of 2, 4, 6 or more degrees Celsius would dramatically, ruinously and calamitously amplify the hydrological cycle by 15, 30, 40 percent or more.

Attached to US Army military academy at West Point (where through the Civil War military officers had been trained as engineers for purposes of fortifications construction), the Corps of Engineers had its origins in the war of 1812, specifically in the absence of fortifications in a city which the US army was at any rate unable to defend against British invasion. (Recall that Andrew Jackson's political career derived its impetus for his role in these events, for it was the successful defense of the city against British attack by commercially oriented trappers and hunters otherwise known as frontiersmen and by yeoman farmers that made him someone other than another uniformed soldier.)

Throughout the nineteenth century, the Corps expanded harbors, dredged them and rivers, removed trees, tree trunks and stumps from rivers, and built bridges, dams and levees as part of the Whig and later Republican programs of industrialization. It carried out this work, above all, along the length of the Mississippi River. Straightening the river (reducing travel times of agricultural produce, raw materials and finished goods, hence the turnover times in a cycle of expanded capitalist reproduction) by cutting channels and closing off streams that meandered in and out of the river (especially south of Memphis) was one important task which created another: With elimination of each and every outlet, the velocity of river flow increased accordingly, as so did the silt since the Mississippi drained the entire center of continent North America. South of Memphis, the swamps and bayous had been the natural reservoirs for draining the heavy flows downriver in those years of large snowfalls in the Rockies (feeding most importantly the Missouri), the North (Minnesota, Fox, Illinois) and the Midwest reaching back to the Appalachians (a region drained by the Ohio and its tributaries) and the mid-South (Tennessee, Cumberland). The runoff and, additionally, the silt (formed in the runoffs of dead, decomposing vegetative matter, sand and other minerals all products of the accumulated weathering of rock by plant action and erosion) had nowhere to go: Long before it was deposited at the mouth of the river, it raised its bed that in years of heavy runoff flowed with extraordinary force and power and with accelerated velocity. Earthen ramparts, levees, had to be built. Long before the Civil War, they were three feet high, then six, twelve and then, before the great 1927 flood, twenty one feet high.⁵ Behind these levees, farming had been done, cotton was grow and later soybeans; towns had sprung up, and large scale industry between Baton Rouge and New Orleans had begun to appear. These had to be defended. This was the Corps' responsibility. The Congress appropriated a massive sum (\$300 million) in 1928 after a particularly heavy winter snowfall had led to the 1927 flood, which had more or less drowned all these capitalist concerns (farms, small town retailers, nascent industry).⁶ The flooding itself was, of course, a socially mediated natural event, for the most part a product of the simple fact that, excepting the large rivers such as the Atchafalaya (which in turn flooded), there were no streams and outlets to capture the massive flows the Mississippi carried. This stood to reason, at least a reason that went beyond the instrumentalist rationality that saw in nature only the enemy to be occupied, conquered and rendered fit for capitalist production and exchange.

Over geological time, the Mississippi had created by far the largest part of Louisiana through its silt deposits. But contrary to the Corps, and against various bourgeois projects aimed at nature domination, this would have never happened had the river been the long narrow channel reaching to the Gulf that the Corps attempted to contain it in. For had it been, southern Louisiana would have been just that, an elongated thin peninsula extending into the Gulf.⁷ Its contemporary historical form has taken this shape because the river has moved about hither and thither within an arc of roughly 320 kilometers (200 miles). As sediments build up its bed along the river itself, it will suddenly, even dramatically, change course, swell up and then rushing over one bank and off in another direction. (An cursory examination of US Army maps of Civil War Louisiana and Mississippi show that it appeared to wind and bend endlessly, even looping around back on itself in these intensely swampy lands.)⁸ But in the end, as the Mississippi moves southward, and the further south it gets, it moves by the most direct and steepest gradient. All this is particularly characteristic of its main channel, which changes course about every thousand years. Three thousand years ago, that channel was Bayou Teche; two thousand years ago, it was taken by Bayou Lafourche; and about a thousand years ago, it assumed its present course through the region known as the Plaquemines.⁹

In the forties of the last century, the Atchafalaya captured the Red River at its mouth (which had for a couple thousand years ran into the Mississippi, a tributary), increasing its power and draw, and since

⁵ John McPhee, "Atchafalaya" in *The Control of Nature*. New York, 1989: 36, 41.

⁶"Ibid," 42, 43.

⁷"Ibid," 5.

⁸Here, we have consulted *The Official Military Atlas of the Civil War*. New York, 1983.

⁹McPhee, "Atchafalaya," 5-6.

1950 or thereabouts, the Atchafalaya River has threatened to capture the main Mississippi channel, for its grade southward is much steeper and the distance from it to the delta is less than half that of the Mississippi.¹⁰

What was at issue? Not just the demise of Baton Rouge, the virtually assured destruction (topographically and socio-economically) of New Orleans, but the "American Ruhr" itself, that region between the two cities in which a massive petrochemical complex had grown up... A water land of gigantic capitals consisting in names like B.F. Goodrich, Uniroyal, Georgia Pacific, du Pont, Monsanto, Vulcan Materials, Freeport McMoRan (Freeport Chemicals), Dow Chemical, Allied Corp. (Allied Chemical), Occidental Petroleum (Hooker Chemicals), Rubicon, Inc. (Rubicon Chemicals) and Total (American Petrofina)... If the Atchafalaya captured the Mississippi's main channel, the old channel would be reduced to a small sized river, a backwater, and just another bayou. This could not be permitted to happen. As McPhee put it: "The industries were there because of the river. They had come for its navigational convenience and its fresh water. They would not, and could not, linger beside a tidal creek. For nature to take its course was simply unthinkable."¹¹

Re-enter the US Army Corps of Engineers. Having plumbed the Mississippi north of Memphis (and southward too), like the Bureau of Reclamations had plumbed the rivers of the Southwest and the Far West, for example, transforming the beds of creeks, streams and rivers into cement and concrete waterways and, in so doing, intensifying inequalities of class here rooted in access to water,¹² like the great oil capitals having plumbed the floor of the Gulf (with five thousand wells and all the piping running between the them), the Corps would fix the problem (and with about the same results, e.g., the 2010 BP Gulf oil disaster).

So, in the fifties the Corps undertook to rectify this situation. The point at which the Atchafalaya might have captured the Mississippi was a meander bend (due east of the Louisiana town of Marksville) locally known as Old River, at the mouth of the Red River where some seven miles separated the Mississippi from the Atchafalaya. It was at this point that water escaped from the former to the latter, and not just a trickle or little runoff: At times, water in the amount of five times that dropping off the falls at Niagara would be captured by the Atchafalaya.¹³

The Corps dammed the meander bend (with a trapezoid earth works a hundred feet high built into its locks linked to the main levee running alongside the Mississippi), but it could not kill the Atchafalaya – too many, countless, towns and small cities downstream dependent upon it for their water supply and livelihoods: It had to permit a significant flow into the Atchafalaya. But the more flow the Atchafalaya was presented with, the more it wanted to take. It was the steeper river. The more water it was given, the deeper the Atchafalaya cut its bed, heightening the conditions for capture. (On the particular day McPhee was present in 1983, the Mississippi to one side of the dam was eighteen feet above sea level, the Atchafalaya to the other was five feet.)¹⁴ And the disparities in levels would continue to grow, further heightening the conditions for capture. The effort to arrest this development, while providing a controlled release of the Mississippi into the Atchafalaya, took place ten miles upriver from the dam and lock. In 1963 the Corps constructed a 10-pier bridge 565 feet long, a sill with 11 gates supported by steel pilings set down 90 feet into the silt¹⁵. It was called Old River Control. It was considered the last word in management of nature, or the Mississippi as nature, and it worked fine for a decade. In winter of 1972-1973, snows in the upper valley of the Mississippi (the Midwest) were unusually heavy. In the past decade a great deal of sediment had accumulated along the river bottoms, decreasing volume, but with the snow melt, high water flowed just that much higher and volume increased markedly (to 2 million cubic feet of water a second bearing down on Old River Control by mid-March into April.¹⁶ This flow, it should be noted, is nearly on the order of oceanic current movements, measured in Sverdrups, each of which is equal to the flow of one million cubic meters of water per second per square kilometer. The volume of the movement from the Mississippi to the Atchafalaya was about a quarter of a Sverdrup but the area in which it occurred was far more compressed.) The gates had to be opened, that or the river would have destroyed the Control (as it was the structure was nearly wrecked anyway). At this point, the river "was a slab of water six stories high, spread to the ends of perspective" as 25% of the Mississippi

¹⁰*Ibid.*, 7, 10.

¹¹*Ibid.*, 6.

¹²Marc Reisner, *Cadillac Desert: The American West and its Disappearing Water*. New York 1993 (1986): 132-331.

¹³McPhee, "Ibid," 7.

¹⁴*Ibid.*, 8.

¹⁵*Ibid.*, 10, 11.

¹⁶*Ibid.*, 26-27.

flow poured into the Atchafalaya.¹⁷ The foundations of the Old River Control had been so severely compromised that, pouring millions of tons of rock riprap and cement grout into them, it took nearly three and half years to restabilize the structure. Like the one before it in 1927, the year 1973 was said to be a hundred year flood. So was the 1983 flood, then the 2008 flood and once again that of 2011 (in which the Old River Control was opened once more flooding thousands of square hectares, the Atchafalaya Basin so-called, that included a center of soybean production in the United States as second largest soybean producer in the world, all in order to save Baton Rouge, New Orleans and, above all, the massive site of the great petrochemical capitals, the "American Ruhr").

But there is more. Plumbed and canalized, the whole of the vast region the Mississippi River cuts through from Old River Control down to the Delta is sinking. Silt, sediments, are kept within the levees that traverse the southern reaches of the river, pushed down the river to the Gulf at a rate that exceeds 350,000 tons a day.¹⁸ As the water flowing between the levees on each side of the river rises, the ground behind to their east and west settles. The sediment never reaches the areas where it is most required – below New Orleans down to the Delta – because the Corps dredges it, assuming the absolute primacy of capitalist commerce, to keep the river open for navigation. The sediments are dumped, not in coastal areas but off the continental shelf. The ground, where it exists, to either side of the river continues to sink. St. Bernard's Parish which includes New Orleans' eastern suburb is two percent solid earth, eighteen percent marshland and eighty percent water. St. Bernard's Parish is protected by a 6.4 mile T-wall tied into the Inner Harbor Navigation Canal Lake Borgne Barrier on the west and to the Bayou Dupre Sector Gate on the east, constituting a ring levee of sorts.¹⁹ Every square centimeter, meter and kilometer within this levee pushes water upward somewhere else. On average, New Orleans is now a foot to two below sea level, ten feet below at its lowest spots. A whole class geography is based on this socially constructed natural fact: Those ruling class social groups living in New Orleans have residences above sea level, sixteen feet at the highest; the black working class in the ninth ward has homes that are nine feet below sea level. New Orleans is a bowl, broad and shallow, and, subsiding between the Mississippi and Lake Pontchartrain, it is only the tall levees that prevent it from actually being under water. Exacerbated by, in fact the whole process accelerated by, the access canals to oil and gas wells built along the continental shelf, the parishes below New Orleans... Jefferson and Plaquemines, even Terrebonne far to the west... are coming apart like a rotted old rag.²⁰

The damage visited on New Orleans by Hurricane Katrina was not simply that of a freak storm occurring in nature (actually the event was a dividing line, separating seeming natural events of the past from those of today and into the future which are more causally mediated by the warming induced climate change rooted in the dynamics of capitalist development). Whether or no anyone actually does, the logic of our situation (the momentous fact that we are living through epochal events in both nature (a series of causally interrelated events the only analog for which reaches back 55 million years) and in society in nature (the catastrophic end of the only global civilization humanity has ever known) compels us to make a comparison, merely as matter of making a beginning to an elucidation on the smallest of scales of the situation we confront:

Katrina can and should be likened to the recent flooding (August 2011) in the US Northeast, to northeastern New Jersey, then up the Hudson, into western Connecticut and Massachusetts, and above all in southwestern Vermont; the homes underwater in New Orleans should be likened to that to damaged roads, bridges and towns wrecked by what was by then nothing more than a tropic storm (Irene)... It should be noted that Irene was no mere tropical storm in the specific sense of size and the water content it carried, and in this sense it was larger than a category three hurricane.²¹ This points to the growing amount of moisture in the lower atmosphere as warming induced climate change deepens.²² Nonetheless... Both (Katrina and Irene) have been only immediately and directly the consequence of a natural event, an "act of God"; but mediately, and causally much more importantly, both were events that transpired in the order of society (society in nature), grounded, first, on massive over construction of built environment and then, second, that increasingly moisten laden storms as a consequence of atmospheric CO₂ and CH₄ inputs and the consequent increased rates of evaporation, the presence of increased water

¹⁷Ibid., 28-30, 47. 27 (citation).

¹⁸Ibid., 58.

¹⁹Ibid., 58-59; *National Geographic Road Atlas of the United States, Canada and Mexico*. Washington, DC, 1998: Map entry for Louisiana, New Orleans inset map.

²⁰McPhee, "Ibid," 62.

²¹Jeff Strahl, personal communication, 3 September 2011.

²²See the text to n. 1, above.

vapor with its enormous latent energy: In the case of New Orleans, it was a matter of the levees that render it a bowl in which any water blown in from the Gulf will be trapped and slosh around in; in the case of the Northeast, flooding was *not* by and large a matter of decaying infrastructure but of structures built up too close to waterways, of natural vegetation with its water absorbing root structures cut down and uprooted for endless expanses of concrete and blacktop (for homes, office buildings, strip malls, restaurants, and other venues of consumption, themselves the products of the flows of capital that seek outlets for accumulation in the teeth of enormous commodity surfeit, of overcapacity and overproduction). In both cases, it was a matter of a social world that presents no natural places or humanly shaped natural ecologies for the water to go other than into the human bowels of that world.²³ Some may call this the revenge of nature: "Payment" for ineffable crimes against the Earth. Maybe. The more adequate insight is this: These disasters are the necessary outcomes of a qualitatively deepened and ongoing, further deepening of the real domination of capital over society in nature, and over nature itself in which capitalist activity generates a form of the integration of humanity and nature that (in geological terms temporarily) tears apart the coherency of earthly nature as a complexly interconnected totality of relations, events and processes.

²³As in the case of the great Mississippi River floods of the last century, 1927, 1973, 1983, where causation was even clearer: In each case, "It was not a hundred year flood. It was a form of explosion, achieved by the confining levees." McPhee, "Ibid."

Origins

Some Premises

*Evolutionary-Anthropological and Philosophical Grounds
of the Critical Analysis of the Civilizational Totality We Call Capitalism*



Homo Middens (1992). Vicki Barnes

Capital and the Crisis in Nature

From that moment at which what Marx called real domination in production (determined by the systematic incorporation of science and technology into that production) began to effectively hold sway over the world, capitalism has developed and can only develop through destructuring nature in its objectivity, reconstituting it as a sink of unprocessed supplies, a standing reserve of matter whose meaning and existence is exhausted in being reworked in capitalist production. Capitalist development proceeds by way of the disruption, dislocation and in all cases destruction of the autonomy, coherence and otherness that is earthly nature (increased inputs to the carbon, methane, sulfur cycles raising atmospheric CO₂ and CH₄ levels, increasing acidification of the oceans, shutdown and then shifting of the thermohaline circulation which is in part already underway) that, creating rapid climate change, is already rendering access to resources more difficult, reduces production of agricultural foodstuffs, renders industrial raw materials production less reliable, places greater strains on the infrastructural foundations of capitalism and vastly narrows the basis in earthly nature for human activity in its capitalist form.

Capital's representatives have proven unable to even adequately pose, much less take up, climate change issues, while it is increasingly manifest that technical innovations within capitalism will not keep pace with that change, and are not capable of addressing it in its scale and complexity... Without the revolutionary overthrow of capital, abolition of a separate technology,²⁴ and a novel theorization of our relation to nature, climate change and the problems it presents, those it creates and those it exacerbates cannot even be addressed. But the moment at which capitalism could have been transcended has long since vanished, leaving us with increasingly large-scale climatic disruptions ending in a cataclysmic transformation:

The movement of capital necessarily produces despoliation of earthly nature (*recreation of the Earth as a raw material basin for commodity production*), *mass species extinction* and *climate change* with the possibility of runaway warming.

The Geophysiology of the Earth, I Climate and Climate Change

The Earth as we immediately apprehend it, inclusive what we call the biosphere (life at Earth's surface and the oceans, landmasses and atmosphere that support it, that shape it and are shaped by it), is a unitary phenomenon, its various partial moments (weather, oceans, atmosphere, abiogenic substances, organic life including "man") are fully integrated and mutually dependent. It is self-regulating whole, a totality whose internal diversity (precisely that which capital *without* regard to climate change is destroying) provides it with its own coherence and guarantees the preservation of life on Earth... we shall return to this below... As the "external envelope" of Earth, the biosphere in particular orders the constant energy inflow from space (solar energy) on which it is dependent. The constitution of Earth's moments, its partial "systems," especially the biosphere, have qualitatively changed over geological time, meaning that life (the biota in its entirety) and the Earth abstractly understood as a geophysical reality have co-evolved, each inseparably from the other, hence in their co-evolution each transforming the other... We call this intimate, internal and determinate relation of life to the geophysical structure of the Earth its *geophysiological* construction... While cosmologically the Earth is situated in a nature that can be abstractly understood "physically" (but this is woefully inadequate, failing to comprehend nature's atemporal becoming), what is basic for the Earth itself as self-regulatory can *not* be comprehended as a physical system: *Fully mediated by life*, especially prokaryotic life (bacteria), those moments or "partial systems" dynamically reorder and restructure themselves to maintain earthly nature's equilibrium (expressed "physically," inflow of solar heat equals its outflow over time).

Subject to disruption and imbalances by way of cosmological perturbation, to determination by the Earth's own solar system situatedness and to capitalist development, climate change is a "system's" "effort" to re-equilibrate, an equilibrating that appears to us as disruptive change, a huge and growing

²⁴A separate technology is constituted in production processes that inscribe authoritarian-hierarchical social relations of command-obedience in the very sensuous-material organization of those processes and their outcomes (products); they are constituted in and through abstract labor and they rest on its exploitation, i.e., it *necessarily presupposes* the logic and movement of capital and all the other productive separations or alienations (*Entfremdung*) which characterize capitalism (i.e., work from skill, work from product and means of producing, and conception from execution in the work processes). A separate technology is in turn inextricably tied and umbilically connected to the modern science of nature, i.e., from the bourgeois theory of nature, which in its turn provides the conceptual mediations that make the domination of nature leading to dismantling and destruction of intricate, intimately connection ecological niches and biomes, mass species extinction and abrupt climate change *real and actual*. See, further, *Capitalism and the Domination of Nature*, Part III, "Techné I: Capitalism and Technology," below.

imbalance that occurs, we simplify, as certain "greenhouse" gases (carbon dioxide, methane, water vapor) accumulate and trap heat within the atmosphere (blocking it from re-radiating back into space) while at the same time they absorb solar insolation (incoming radiation). This imbalance is equilibrated by a planetary warming that starts, imperceptibly, with the warming of the land masses, even more imperceptibly with the oceans, then perceptibly with the melting of snow and ice caps and the heating of the atmosphere...

While the Earth, at some 4.5 billion years of age (the period of its formation constituting its first 700 million years), is estimated to be nearly as old as the solar system, geological dating begins in evidentially based *detail* 540 million years ago with the emergence of truly complex, highly developed life forms (the immediate predecessors of fish, insects, reptiles) in a simply eruption of new forms of eukaryotic (cellularly nucleated) life known as the Cambrian explosion. Within the entirety of this vast sweep of geological time down to present (in fact, going back another 160 million years into the preCambrian), we can reconstruct two broad types or modes climate on Earth. These types are "cool" and "warm," sometimes referred to as "cold and dry" and "hot and wet," respectively. A simple determination of a type of climate can be offered, namely, the presence or absence of ice: A warm type or mode of climate is determined by the absence of ice, and a cool one by its presence. The latter can range to seasonable cold at high altitudes where ice covers the highlands associated with great mountain ranges as well as the higher reaches of mountains themselves, to the presence of an intense glaciation which, geographically, emanates from the poles covered with permanent ice caps. For the latter, intense glaciation, has over the last billion years only occurred when there are land masses very near or over the poles. None of this, however, means the regimes of climate on Earth are cyclical, or alternative. They are not, and they do not.²⁵

There were also periods when landmasses were not near or at the poles:

Antarctica split off from the ancient, gigantic continent known as Gondwana (encompassing present day Australia, Antarctica, South America, Africa and Asia Minor and Arabia) and arrived at its current locale over thirty million years ago. Before it reached what we identify as the southern pole it had already begun to glaciare (in response to tectonic changes, to plate uplifting and volcanism). The formation of the Southern Ocean, as an open waterway (with accompanying winds) sweeping round the Earth, isolated Antarctica creating an atmospheric barrier against weather systems beyond this continent. Until recently, Antarctica has largely made its own climate, one very cold and dry, which, in turn, has helped cool an Earth that hitherto (prior to its separation and drift) was warm and wet, Gondwana largely a temperate rainforest. Some twenty million years ago, tectonic activity entered a period, still ongoing, of considerable diminution (after the continents as we know them today formed), lessening, for the geological time being, its determination in the formation of climate. Continental drift has brought large landmasses near to the poles thus allowing the Earth's orbital eccentricity to cyclically create ice ages.²⁶

Beginning about two and half million years ago, the dynamic climatic structure characterizing the most recent geological epoch stabilized, slowly taking on its present form (designated the Pleistocene). Geological "contemporaneity" has largely been resolved into three great cycles, called Milankovitch cycles, that drive the Earth's climatic variability. The geological condition that has enabled them is continental drift: It has brought large landmasses near to the poles thus allowing the Earth's orbital eccentricity to cyclically create ice ages.

The Earth's orbit around the sun is elliptical completing a cycle roughly every 100,000 years. At its greatest as opposed to its smallest distance from the sun, a determination of the Earth's eccentricity, there is a 20%-30% reduction in the amount of radiation (heat) that reaches the Earth. At that eccentricity, it is this relation (of sun to Earth) that has produced ice ages at more or less regular intervals over the last seven hundred millennia, perhaps the last million years. The second cycle concerns the tilt of the Earth on its axis, its obliquity. Tilt determines where the most radiation from the sun will fall on the Earth. A full cycle occurs every 42,000 years. As the Earth revolves around the sun, tilt produces seasons. The last, shortest cycling, periods of 19,000 to 23,000 years, turns, so to speak, on the Earth's wobble (called precession). Created by the magnetic mass distributed unevenly and off-center between the Earth's solid inner core and mesosphere, wobble creates a shift on average every 21,700 years in its, the Earth's, "true (celestial) north" (north determined along its axis in contradistinction from the

²⁵See the Prologue, fn. 1, above, for elaboration and explanation.

²⁶These cooler, drier conditions were particularly noticeable in Africa. And, under these newly forming climatic conditions, species, especially some of the truly large species (ancestors to many of today's large mammals who to them stand only as dwarf instances), died off and new one appears. Among the latter group are hominid lines, including the larger brained hominids who appear to be *our* ancestors.

geographical north pole) from Polaris to Vega. This shift affects seasonal intensity (e.g., hot summers, frigidly cold winters), and a half cycle is said to determine the average length of the warm periods between glaciations. In the case of all orbital cycles, the changes in radiation that reach the Earth are dramatically increased, *"amplified"* in the same cybernetic language of capital, by the *amount present* (more or less) *of those gases*, especially carbon dioxide, methane and water vapor (the first two are produced by plant and bacterial life), that trap solar radiation in the atmosphere. Involving the carbon cycle (which, in turn, revolves on the *living* presence of large tropic forests as carbon sinks and their relation to dynamically interacting atmosphere and oceans), a *rapid and dramatic increase, "amplification," is what brings about a geologically characteristic abrupt transition from cold to warm climates on Earth.*

Until now, we have lived in a cold, dry type of earthly climate, one characterized by glaciation. (It is now part of the geological past): Within the cycles of this glaciation as it has unfolded beginning some 1.8 million years ago, each period of intense cold with extensive ice coverage especially in the Northern Hemisphere (and the higher latitudes of the South Hemisphere) has been followed by a period of warming, one of much shorter duration - on average roughly 10,000-12,000 years called an interglacial. (This temporal determination excludes the abrupt warming period, say a couple thousand years, of transition from glacial to interglacial, and the far slower cooling period, say, as much as nine to ten thousand years, of transition from interglacial to glacial.) Humanity, as it exists and largely as we understand it today, beginning with sedentary agriculture, and the rise of the state and civilization, has appeared and developed in the current interglacial. In this regard and in terms of timescales, the historically contemporary warming moves in a direction opposite cyclical cooling (signs of which should be abundant) which is, absent capitalistically generated warming, what in geological timescales would be expected. This current interglacial, transitions aside, stands out because it has already continued for a long period and, with the ongoing warming, shows no signs of abating: Instead of growing ice sheets, we are witness their retreat and approaching collapse.

Occurring over geological time, a time frame which has no meaning from the standpoint of an individual human life, these cosmic determinations (eccentricity, obliquity, precession) of Earth's climate are called forcings. Today, their relevance pales and has become virtually insignificant in comparison with the movement of capital which, without doubt, has become the decisive geological force on Earth²⁷...

We have referred to the past in terms of "reconstructions." This might be the occasion for curiosity. In fact, there is no direct or immediate evidence for what we know in this regard: There is the obvious point that there are no written records or humanly produced records of any other sort that describe the climate change that began circa 16,000 years ago with the transition from the last glaciation to the present interglacial.

²⁷The recognition that, bearing the imperatives of capital, humans are altering the Earth at an accelerating rate has penetrated the modern science of nature, its bearers. Noted is the appearance of sufficient transformation to generate a stratigraphic signatures in sediments and ice. Thus, we have the following appearing in January (08), 2016 in *Science*: "Fossil fuel combustion has disseminated black carbon, inorganic ash spheres, and spherical carbonaceous particles worldwide, with a near-synchronous global increase around 1950. Anthropogenic sedimentary fluxes have intensified, including enhanced erosion caused by deforestation and road construction. Widespread sediment retention behind dams has amplified delta subsidence.

"Geochemical signatures include elevated levels of polyaromatic hydrocarbons, polychlorinated biphenyls, and pesticide residues, as well as increased ^{207/206}Pb ratios from leaded gasoline, starting between ~1945 and 1950. Soil nitrogen and phosphorus inventories have doubled in the past century because of increased fertilizer use, generating widespread signatures in lake strata and nitrate levels in Greenland ice that are higher than at any time during the previous 100,000 years.

"... species assemblages have been altered worldwide by geologically unprecedented transglobal species invasions and changes associated with farming and fishing, permanently reconfiguring Earth's biological trajectory.

"...recent lake sediments... include unprecedented combinations of plastics, fly ash, radionuclides, metals, pesticides, reactive nitrogen, and consequences of increasing greenhouse gas concentrations. In this sediment core from west Greenland (69°03'N, 49°54'W), glacier retreat due to climate warming has resulted in an abrupt stratigraphic transition from proglacial sediments to nonglacial organic matter..." (Colin N. Waters, et al, "The Anthropocene is functionally and stratigraphically distinct from the Holocene," *Science*. Vol. 351, Issue 6269.

While the authors call for formal periodization of this transformation at the epochal level, note the date: The moment which, narrowly (i.e., stratigraphically) to be sure, demarcates the Holocene from the Anthropocene so-called is precisely that moment at which, elsewhere,* we have surmised that *the real subsumption of labor under capital had become effectively actual in large parts of the world to require alteration of the significance of real domination, no longer merely a mode of surplus value extraction but an era in the history of capitalism. And this, of course, is decisive for its the capitalist dynamic (i.e., the logic and movement of capital) which has produced this planetary transformation.*

That raises a problem: If the human senses themselves, formed in interaction with nature, in work and labor, are the product of entire history of their development (they are), and if all knowledge starts from experience (it does), experience shaped by work and labor and the changing conditions they produce, among the varieties of which sensuous experience (experience grounded in the senses, in seeing, hearing, etc.) has a particular primacy, then legitimately there is a question as to how it is possible to know anything which predates us, since that which predates us in nature has disappeared, since the nature we experience is itself the product of our interaction through work and labor with it over thousands of generations. In other words, how is it possible to speak of a "nature prior to man"? How can we know anything that entirely transcends that experience?

Early in the epoch of capital's formal domination over labor in production in the social formations of western Europe, the Scholastics as the organic intelligentsia of a rural ruling class formed by landed lords debated the nature of the immateriality or materiality of a being that is situated somewhere between divinity and humanity. This debate, which today we dismiss as so much nonsense about how many angels can be fitted on the head of a pin, exemplifies the significance of a discussion that proceeds without any reference to experience, for a straightforward discussion of the geological past (termed "realist") is metaphysical in precisely this sense.

We, unlike the scientist, speak of reconstructions because the evidence, while involving specifiable theoretical assumptions and interpretations, is not merely logical and conceptual (as, e.g., an inference from a set of premises); and while that evidence of the past is not direct and unambiguous, it is based on what are called proxies (ice cores with their molecular oxygen components, sediments found at the bottom ancient lakes and bogs, etc.) which are the basis of measurements which provide indirect evidence, for instance, of dating, ancient temperature, etc. and which are analyses in principle accessible to anyone. Proxies provide indirect evidence that suggests the prior existence of a long, geophysically lengthy, history of the development of the Earth that went through various stages and phases to arrive at that moment where a man-nature interaction and relation first formed. It is this perspective on nature that is formed and established or is reconstructed, i.e., that has the logical status of an ideal or theoretical reconstruction, a conceptual effort to reach back to earthly conditions which appear as the basis of our being and thought.²⁸

The Geophysics of the Earth, II *Abrupt Qualitative Change in the Global Climate Regime*

The transition from intense glaciation to an interglacial can occur abruptly, not over thousands of years (as cooling, the transition from an interglacial back to a glacial, always does), but in the temporal framework of actual historical time, in hundreds of years and, once all the preconditions have become real, actually set in place so to speak, perhaps even in as little as a decade. Abrupt climate change may well characterize the far "grander" transition from a cold and dry climate mode to a hot and wet one (which is the great danger we confront), and it certainly defined those mass extinction events which characterized the Triassic-Jurassic and the Paleocene-Eocene boundaries (213 and 55 mya, respectively) and which occurred in already warm worlds *without* ice.

There are several nodal points within the total system of interrelated relations and processes that characterize earthly nature that, subject to severe strain (to disruption), will under conditions of planetary warming rapidly accelerate the change that is taking place, and that are likely to render it irreversible in the geological short-term (i.e., for at least several tens, if not hundreds, of thousand or even millions of years). These are moments of qualitative change, inflection points, what Earth systems and climate sciences call, on more time in the cybernetic language of capital, "tipping points."

The most important of these relations and processes are the thermohaline circulation, the great rainforests, and ocean floor methane hydrates together with the methane frozen in Arctic permafrost.

Here we shall consider just one of these nodal points.

If it is permitted to initially develop (unless the global capitalist economy in its entirety collapses and shuts down under the weight of its own contradictions), a runaway warming will start from a dissociation of methane hydrates, otherwise known as clathrates. Commonly thought to form through the bacterial breakdown of organic matter in low oxygen environments (entering the oceans along the continental shelves at the mouths of rivers carrying that decaying matter), methane hydrates are also *continuously* created as a result of shifting tectonic movement: An overlay of a map of methane hydrate deposits

²⁸Similarly, see *The Materialist Dialectic: Why the Study of Human Origins is Necessary and Why it is Indispensable to the Critique of Science and Inseparably that of Capital*, the Introduction, "What is at Issue in the Examination and Analysis of Human Origins," above, for further explication.

worldwide on a global map of tectonic plates shows that they are densest along those continental coastal regions where plates are most active, *and* where areas of subvention or divergence are littered with active volcanoes (i.e., the Pacific and North American plates along the western continental coast, the Aleutian Trench, the Pacific and Eurasian plates in the area of Japan and the Sea of Japan, and the divergent plate boundary in the Arctic between the North American and Eurasian plates known as the Gakkel Ridge). Tectonic processes (and, to be sure, volcanic ones as well) emit gases, including carbon dioxide, which, in contact with hydrogen radicals in ocean waters form methane: In this cold and with pressure at these depths, they, like the methane excreted by bacteria consuming dead organic materials, are frozen in water-molecular cage-like solid structures. These structures are the methane hydrates. Intense pressure and extreme cold are the only conditions under which methane hydrates are stable. They will become unstable as the oceans warm, particularly in shallow waters such as those in the Arctic Ocean, e.g., along the coast of northern Siberia. (A similar situation obtains with partially decomposed organic matter, 50 million-year old tropical rainforests and accompanying organic debris, that is buried under the Arctic permafrost.)

Methane hydrates have been settling in the shallow sea sediment in vast quantities since the late Pliocene (i.e., for well over 2 million years) as ocean waters rapidly cooled. There have been *limited* releases about 12,800 (and perhaps about 9,600) years ago, and from roughly 120,000 to 130,000, 240,000 to 250,000, 340,000 to 350,000, etc., i.e., during the rapidly warming phases of interglacials over at least the last 800,000 years.²⁹ In these instances, the release has been a consequence of cosmological determinism or orbital forcings (i.e., the closer orbital position of the Earth to the sun). Their release has, accordingly, been “slow” enough (and limited) that the methane has been almost entirely oxidized. Today, the situation is different, in fact unprecedented. First, if the warming is rapid enough, some, not all, of the methane hydrates will not form the less deadly greenhouse gas CO₂ (i.e., they will not be oxidized in the water). Instead these will be *released directly* to the atmosphere as methane. Occurring at 10,000 times the rate of an orbital forcing, “anthropogenic warming,” i.e., *warming induced by the movement of capital*, here and now we are witnessing a release in a contemporary (not historical, and certainly not geological) time frame for which there is no analog. Second, because past releases have been limited, the quantities of methane hydrates have grown absolutely over geological time and grown enormously.

The highest latitudes play a decisive role in warming, especially the Arctic (as opposed to the Antarctic which circumscribed by the Southern Ocean and the lower portion of the southern jet stream until “recently,” understood geologically, formed its own very cold climate). At the moment of the last mass extinction “event” at the end of the Paleocene inaugurating the Eocene (some 55 million years ago), an enormous warming was generated by volcanic eruptions of carbon dioxide. What is particularly significant and portentous is that methane hydrate release was not of the same order of significance to warming then as it is now. (One has to return to the end Permian extinction “event” for a geological analog to the situation we face): As methane hydrates dissociate some more rapidly than others, two events transpire. As the methane hydrates in the warmest, shallower waters are released from intense pressure the gas trapped in them will not be oxidized but will release directly to atmosphere and expand to 160 times its volume at the original moment of rupture. (The importance of this lies in the greenhouse gas global warming potential (GWP) of methane: Over a 20-year period, it is 84 times greater than carbon dioxide.) Methane hydrates in deeper water that warm more slowly will be consumed by ancient

²⁹This passage (concerning *limited* methane releases at the outset of interglacials) dates to the January 2012. It did not appear in a revision of this work until spring 2013; thereafter it was incorporated into this discussion of runaway planetary warming as it appears in this essay. Clearly our analysis has anticipated later findings:

Over five years later, a recently published, new study (K. Andreassen, et al, “Massive Blow-out Craters Formed by Hydrate-controlled Methane Expulsion from the Arctic Seafloor” *Science*, Vol. 356, no. 6541: 948-95) has discovered evidence of enormous craters embedded within methane-leaking subglacial sediments in the sea bed off Svalbard in the Barents Sea. These methane hydrates are thought to have erupted from the sea bed when ice sheets retreated at the end of the last ice age, some 12,000 years ago.

Karin Andreasson, the lead author, noted (in Phys.org, 2017.06.01): “As climate warmed, and the ice sheet collapsed, enormous amounts of methane were abruptly released. This created massive craters that are still actively seeping methane” - today, as we conjectured, and at the end of each glacial for at least the past 800,000 years, based on charts indicating CO₂ spikes at the outset of interglacials over the past 350,000 years. The *generality* of our speculative assessment has been re-confirmed, see Natalia Shakhova, “Understanding the Permafrost-Hydrate System and Associate Methane Releases in the East Siberian-Arctic Shelf” (*Geosciences*, 2019, 9, 251) accessed online at <https://www.researchgate.net/publication/333619219> (June 2019), 3.2 (“Mechanism of Arctic Hydrate Origination”) and 3.3 (“Principal Scheme of the Permafrost-Hydrates System”).

photosynthetic anaerobic bacteria (methogens) that inhabit sea water sediments far below the chemocline (that point at which oxic waters above are separated from anoxic waters below). These bacteria metabolize sulfur and methane (as we do oxygen) and produce hydrogen sulfide as a waste byproduct. The chemocline will begin to rise (it already has) closer to the surface as the oceans warm, giving these bacteria greater access to the sun, allowing them to thrive. Enough warming and ocean waters will visibly exhibit vast stretches of sulfur bacteria at the surface as great bubbles of hydrogen sulfide erupt into the atmosphere. Carbon dioxide is poisonous, methane is far more poisonous, and hydrogen sulfide is qualitatively deadlier: One molecule in a thousand of air kills human beings. A single breath can be deadly. There is as much methane within clathrates as the aggregated amounts of all the gas and oil reserves on Earth. If this is not enough to fuel a methane-based, hydrogen sulfide mass extinction, then, to boot, the atmospheric presence of hydrogen sulfide destroys ozone ($\text{H}_2\text{S} + \text{O}_3 \rightarrow \text{H}_2\text{O} + \text{O}_2 + \text{S}$). As it has in the geologically reconstructed past mass extinctions, lethal UV sun rays will kill off the plant and animal life that survives hydrogen sulfide poisoning.

Warming of the continental landmasses, the oceans and the atmosphere is bringing intense pressure to bear on the Earth's crust through thermal expansion of tectonic plates, and is leading to earthquakes that has begun to exacerbate the methane hydrate situation further, by ensuring destabilization of its ice crystalline-like structure in the deepest waters.

A direct release of methane into the atmosphere will, in turn, vastly heat it up, further warming the oceans, releasing more methane to the atmosphere, further warming the oceans, releasing more methane now in deeper waters in a vicious cycle that would not be broken until, most significantly, Canfield oceans, the prevalence of anoxic bacteria and a vast increase in atmospheric hydrogen sulfide content form the essential features of a new Earth. This would constitute a runaway warming with its deadliest consequence, a methane-based, hydrogen sulfide mass extinction destroying aerobic life as such.

Generally recognized, there has been at least one methane-based, hydrogen sulfide extinction "event," very likely at least three more in the geologically reconstructed past. By far and away the deadliest (perhaps as much as 95% of all species life on Earth disappeared), this extinction defined the boundary between the Permian and the Triassic about 249 million years ago. Regardless of where in geological time one sets these boundaries, others are likely to have occurred at the end Triassic, middle Cretaceous and late Devonian. Methane release to the atmosphere is now occurring again. It is transpiring in enormous amounts in the Arctic, for example, this past late summer, at levels that portend a mass extinction of aerobic life (which, of course, includes human life).³⁰

*Paleoclimate Reconstructions, Evidence and its Implications*³¹

Reconstructions of the geological past start from proxies. The first thing we can note about a proxy, or proxy data, is that it is a quantitative relation. It's a measurement which provides us with indirect evidence for the obvious reason that a measurement cannot directly be made. Who, for instance, could make an assessment of evidence at a site 248 million years old, that is, in the immediate geological aftermath of the Permian extinct? There is, of course, a further epistemological problem here which the scientist never deals with. It doesn't concern us here, and I am confident I have adequately addressed it elsewhere.³²

Proxies are substitutes for contemporary instruments of mensuration - whether those instruments are

³⁰The question of where one set the boundaries of geological periods (or for that matter, eons, eras, periods and epochs) is, for us, open. The dates here are merely conventional and deployed to facilitate both understanding of the enormity of geological time and the catastrophic nature of extinction events which define these boundaries, and which effectively then are decisive for evolutionary developments (thus, happily adding one more reason for forgoing a Darwinian and ultimately uniformitarian vision of those developments).^{*} Beyond this we can only affirm the stratigraphic record is episodic, not merely unfinished but absurdly sketchy, with specific strata and fossils widespread, often appearing where they might not otherwise be expected, with zones within stratigraphic epochs represented at one site vastly compressed or, alternately, expanded relative to another site. Gaps in that record exceed known, reconstructed geological time by as much as an order of magnitude. See Derek Ager, *The Nature of the Stratigraphic Record*. New York, 1993: 1, 2, 26, 30, 36, 50 (chart), 52 (chart), 53, 84, 112.

³¹Composed July 2019.

³²See *The Materialist Dialectic*, the Introduction, above.

^{*} See *Ibid*, Part II, "Population and Environment," and *The Critique of Science: Historical, Materialist and Dialectical Studies on the Relation of the Modern Science of Nature to the Bourgeoisie and Capital*. Fourth Revision/Fifth Edition, 2019: Final Study, Part II.

simple like a thermometer, or complex requiring a great deal of interpretation like computerized data returned from satellite imagery. Proxies permit us to make inferences, for example, concerning dating, ancient temperatures, and past atmospheric and terrestrial conditions. To boot, there are various forms of proxy evidence which are fairly straightforward. Something you or I can do ourselves without instrumental mediation. For example, dating can be achieved by counting rings in a cross-section of a tree. And there are forms that are increasingly complex. Staying with dating, we can instantiate rock stratification, sediment layers found in lakes and bogs, radiocarbon dating, and even more indirect evidence derived from hydrogen, oxygen and carbon isotopes found in various repositories, the calcified skeletal remains of ancient sea life, microorganisms, and in old ice in Greenland or the south pole. In reconstructions of the geological past that directly related to the changing climate, there are two quite different types of paleoclimatic data. And they led to quite different conclusions with respect to the damage an abrupt transition to a new regime on climate inflicts on geologically current forms of life on Earth, including ourselves and the infrastructures, the built environment, we have made in mediating our relation to nature.

At first glance the difference between the two is the time-scale. One gives us evidence that is vastly closer to us in geological time. It is evidence derived from the late Pleistocene, which comes down to essentially evidence of its last 120,000 years the bulk of which is derived either from the onset of the Eemian interglacial (i.e., circa 119,000 years ago) or roughly 16,000 to 10,000 years ago. That is, it is derived from the change in climate which occurred in the transition from a glacial to an interglacial. The evidence here is more detailed and, as a result, better understood or so it seems. Good examples of the type of evidence, and the conclusions it yields, are Wally Broecker's *The Great Conveyor*³³ and Phil Conkling, Richard Alley and Broecker, *The Fate of Greenland*.³⁴

The proxy evidence that is derived from the deep geological past is more dependent on those very complex, and we might add continually improving, methods of obtaining it. This evidence relates primarily but not exclusively to the Paleocene-Eocene boundary and the late Permian.

The difference is not just between two distinct geological epochs but periods, the Quaternary and the Tertiary in the first case; and between distinct epochs, periods and eras in the second case, the Cenozoic as opposed to Mesozoic. But in cases of evidence derived from the deep geological past, it is derived from instances in which the changing climate involved, first, a rapid warming and, second, mass extinctions. Actually, the warming at the Paleocene-Eocene boundary was foreshortened, while the end Permian generated perhaps the hottest Earth over the entire Phanerozoic, the last 600 million years. Good example of the type of the evidence can be found in Zachos and Koch, and Light³⁵ in some popular literature that's quite readable such as Michael Benton's *When Life Nearly Died*³⁶ which explores the end Permian mass extinction, in Peter Ward's *Under a Green Sky*³⁷ which engages in a personal, yet scientific process of discovery in order to lay out the mechanism of mass extinction, and in some more technical, theoretically sophisticated pieces by Malcolm Light, in particular one entitled "Mantle Methane"³⁸ which lays out in great detail the geological characteristics of a methane-based mass extinction. While the evidence from these events may, I said may, appear scantier, at the same time it is unequivocal. It, this evidence, and the conclusions drawn from them unambiguously favor the assumption that underlies this work.

A second glance indicates one other difference between these two different types of paleoclimatic data. While Broecker, or Conkling, Alley and Broecker, are expressly oriented to climate change, Zachos and Koch, Benton, Ward and Light are not. Instead, they are concerned primarily with mass species

³³Wallace Broecker, *The Great Ocean Conveyor*. Princeton (NJ), 2010.

³⁴Phil Conkling, Richard Alley and Wallace Broecker, *The Fate of Greenland: Lessons of Abrupt Climate Change*. MIT Press, Canada (locale unspecified), 2011.

³⁵For Zachos and Koch, the following are representative: Deborah Thomas, James Zachos, et al, "Warming the Fuel for the Fire: Evidence for the Thermal Dissociation of Methane Hydrate during the Paleocene-Eocene Thermal Maximum" (2002); Santo Bains, Paul Koch, et al, "Marine-Terrestrial Linkages at the Paleocene-Eocene Boundary" (2003), Paul Koch, James Zachos, "Carbon and Oxygen Isotope Records from Paleosols Spanning the Paleocene-E Boundary, Bighorn Basin, Wyoming" (2003).

Zachos and Koch deal with what is known as the Paleocene Eocene Thermal Maximum. The PETM marked the end of the Paleocene and the beginning of the Eocene. It was characterized by high latitude warming (subtropical conditions prevailed in both the Arctic and Antarctica), a reversal of oceanic circulation, and ocean extinctions and turnover of land mammals.

³⁶Michael Benton, *When Life Nearly Died*. London, 2003.

³⁷Peter Ward, *Under a Green Sky*. New York, 2007

³⁸For Light, Malcolm Light, "Methane Mantle," *Arctic News*, 28 February 2014.

extinctions. There is, though, a connection.

First, determined by the loss of 50% or more of all species life, there have been five mass extinctions in Earth history starting from the Cambrian, some 540 or more million years ago. Why the Cambrian? It was marked by the initial appearance, an eruption really, of truly complex, highly developed life forms. This means cellularly nucleated life forms, eventually fish, insects, reptiles and of course plant life, which contributed greatly to oxygenating the atmosphere. Bacteria, by the way, are not cellularly nucleated; they do not speciate; they do not sexually reproduce; and no single bacterium contains a complete genetic code.

Second, since the onset of the Cambrian there have only two general regimes of climate on Earth, hot and humid, and cold and dry. These are general attributes. A hot, humid regime does not preclude dry zones, and a cold one does not preclude seasonal temperate regions. The determinant distinguishing one from the other is quite simple. Ice. Ice on Earth whether at the poles or covering the highest mountains. One problem here is that until the upper Cretaceous, about 140 million years ago, the landmasses and oceans looked nothing like to we see today; it was not until 37 million years ago at the outset of the Oligocene that the distribution of continents and oceans as we know it today began to really take shape.

Third, if we consider the five mass extinctions over the last 600 million years, we can note the following. A mass extinction forms the boundary between one geological period and another.

In four of the cases, the late Ordovician which terminated about 450 million years ago, the end Devonian, 360 million years ago, which was actually characterized by several extinctions forming a single mass extinction, the end Permian some 248 million years ago, and the Triassic-Jurassic boundary at about 199 million years ago, in each case the mechanism of extinction was a vast eruption of methane directly into the atmosphere. As a greenhouse gas methane is 84 times more potent than carbon dioxide over a 20 year period, and 23 times more potent over a 100 year period. The fifth mass extinction occurred 66 million years ago with an asteroid impact; it was not generated by a vast methane eruption. The event at the Paleocene-Eocene boundary was, though it did not entail a *mass* extinction.

We might further note that the late Ordovician was characterized by cold regime of climate, the Silurian which followed by a hot one; the Devonian was characterized by a hot climate and the geological period which immediately followed, the Carboniferous shifted from hot to cold to hot in the span of 75 million years; the Permian had been cold, but in a moderate sense: By the end of the period, an ice cap remained at the north pole but ice had disappeared at the south pole. So the Earth was warming. The period which immediately followed, the Triassic, continued to warm. Its reconstruction not only indicated during it Earth was dominated by a hot climatic regime; this climate is considered "super hothouse" and perhaps the hottest over the entire the last 600 million years. The mass extinction defining the Triassic-Jurassic boundary took place during a hot regime of climate. It does not fit the pattern. In the Paleocene-Eocene Thermal Maximum, by the way, as a result of a methane eruption global temperature shot up 6° Celsius (10.8° Fahrenheit). These boundaries events, then, are the reason that in *Capitalism and the Domination of Nature* we zero in on a large-scale methane eruption as the singular most important event which might mark a qualitative transformation in Earth's climate, one from which we would find ourselves (should we be around) in a really hot climate, one which might continue to accelerate in the form of a runaway warming; for a methane eruption is as great a threat today as it was at any time in the geological past... Actually, greater.

We can attempt to draw some conclusions from foregoing. There are two points, really three, we wish to make.

Number one. The features of the climate change examined in the upper Pleistocene analysis that, for instance, engage Broecker do not correspond to what we are witnessing; for two reason, the type of species extinction that is transpiring and the rapidity at which the present warming is occurring.

Number two. We are already in the midst of the sixth mass extinction since the advent of multi-cellular, nucleated life some 600 million years ago - a horrendous "event" which we discuss more fully, and causally, in the following section: Since 1950, 90% of the big ocean fish have been driven to extinction, 50% of fresh water fish, 30% of marine birds, 83% of all wild animals. In those regions where investigations have been undertaken, for example central Europe, 75% of insects have disappeared. With respect to all mammalian life which includes domesticated species, 60% of all mammals on Earth are livestock, mostly cattle and pigs, 36% are human and just 4% are wild.³⁹

³⁹Damian Carrington, "Humans just 0.01% of all Life but Have Destroyed 83% of Wild Mammals – Study," *The Guardian* (London), 22 May 2018; Damian Carrington, "Humanity has Wiped out 60% of Animal Populations since 1970, Report Finds," *The Guardian* (London), 30 October 2018; and Brooke Jarvis, "The Insect Apocalypse is Here." Accessed online

Number three. The mass extinctions in the past have all transpired over millions of years. The late Ordovician lasted as long as 12 million years; the Permian about 4 million years. You have to keep some perspective here. In geological time, these are really very short periods.

While at the moment of a large-scale methane release, the temperature can jump 5-10° Celsius in a couple decades, even less, the transition from a cold to hot climatic regime has in the geological past also taken millions of years.

In contrast, however, seventy years into the undisputed planetary hegemony of capital as real domination, we are, I repeat, already in the midst of the sixth mass extinction. And, in contrast, as any climate scientist who is not beholden to capital for income, status, position and with it job security, for that matter any scientist willing to honestly speak her mind, any one of them will tell you a rise of 8-10° C over the course of the next 2-3 decades cannot be ruled out. Independent scientists, those detached from academia or research institutions, like Malcolm Light or Sam Carana, even Paul Beckwith, Natalie Shakhova and Igor Semiletov who are attached to academic institutions, any one will tell you that, today in the historical present, a large-scale methane release and with it the onset of a runaway planetary warming could happen at any time. In conclusion, we add that precious little plant life, even less amphibian and reptilian life, no insect or mammalian life including humans will survive a 5-6° Celsius rise in Earth's temperature, even in the short run say a decade.

The Materialist Dialectic⁰
Why the Study of Human Origins is
Necessary and Why it is Indispensable to
the Critique of Science and Inseparably
that of Capital

^{40m} *Dialectic* in its materialist form as it appears here emphatically does not narrowly refer to method; to the contrary, methodologically capturing and fixing the object of study and analysis constitutes unacceptable cognitive violence to that object, the imposition of a theoretical schema without regard to determinants immanent to it. To be sure, phenomena do not simply present themselves to us as in Husserl or after a fashion even in Hegel as well. But the reconstruction of the reality (or any of its aspects) in its intelligibility requires a pronounced attentiveness to it, to its immanent forms, their interrelations and its movement, a sensitivity and rigorousness that permits novel or different categories we produce to rise from it, those interrelations, that movement, in order that we recognize if and then when those categories we bring to bear on phenomena exhibit inadequacy (i.e., where our account fails to cohere), demand abandonment and require re conceptualization. Theoretically apprehended and ideally reconstructed, it is the movement of the real itself that the materialist dialectic names and describes.

Prologue

One might think that this work is properly a prolegomenon to The Critique of Science. Simultaneously, it is and it is not: As that critique unfolds, it does not fully justify its consummation and point of arrival, its Postscript; at the same time, the work which follows presupposes the entire development in which the relation of the modern science of nature to the bourgeoisie and capital, always intimate and necessary, becomes increasingly visible.

The question raised here is a matter of expressly stating the set of assumptions which premise that account and analysis. In a philosophical sense, and in the end this is the paramount issue, it is necessary to bring those assumptions out and to permit them to stand forth, and in articulating them to demonstrate they are self-contained, internally consistent and stand alone, in a word, they are coherent, while reaching forward to The Critique of Science. Of particular import in this regard, we are required to explicitly indicate what the specific standpoint within society (societies of capital) from which the inner history of the modern science of nature is reconstructed, to state, in other words, why the convergence of crises in nature and society render this standpoint at once possible and necessary.

This, then, is what is required:

We must not merely understand but comprehend how it is that, while ostensibly pursuing realization of a project aimed at generalizing human freedom, a being called "man" has achieved the ineluctable destruction of its own presuppositions in nature. For humanity, in the end this will be stupendous outcome of an ongoing catastrophically climatic transformation. Before we can even undertake to answer this question, however, we must first account for what such a being is, that is, what it has become; and, this question cannot be posed in the mere historical sense but must encompass the entire anthropological-evolutionary becoming of man.

And this yields a privileged standpoint: For, it is in working through this entire becoming which will permit us in the concluding remarks to identify the moment in the history of society and civilization at which it becomes possible, and necessary, to theoretically apprehend and ideally reconstruct those converging crises, and (as merely a moment in their unfolding) that inner history of science.

Why the Study of Human Origins is Necessary and Why it is Indispensable to the Critique of Science and Inseparably that of Capital

What is justified and valid is confronting the object (society and history, and society in nature) in its specificity and working through it. All legitimate analysis is immanent critique, consciously counterposed to metaphysics. There is no perspective that is relative to nothing else, no Archimedean point outside society from which to elaborate theory or to engage ourselves practically.

Since the end of the millennium, it has become increasingly clear (if only intuitively) the movement of capital has effectively created a situation from within which a novel standpoint has for the first time form. At this specific moment in the history of capitalism, capital patently exhibits itself, subject to the dynamics of its own development, as an anti-human, anti-vital and anti-natural process, a parasitic and predator of almost unimaginably monstrous proportions. Today, its further, future hegemony threatens not only to push humanity back below the levels achieved beginning roughly 10,000 years ago with the development of agriculture, the creation of fixed positions in a division of labor and the most rudimentary formation of a state (achievements that are, at any rate, dubious as achievements); it not only threatens an extraordinary biological regression, destroying forms of life that stretch back from 15,000 years to as much as 55 million years ago; it also threatens to radically alter the foundations of humanity in earthly nature and vital existence, to obliterate Spirit itself, and it threatens those very foundations, earthly nature, through a runaway planetary warming that would culminate in Canfield oceans, the primacy of anaerobic bacteria as life forms and vast increase in atmospheric hydrogen sulfide, rendering Earth incapable of sustaining oxic (oxygen-based) life and human existence.

Thus, we find ourselves at the moment of the conclusion of a vast historical-geophysiological epoch. Actually, we are witness to the terminus of two simultaneously occurring once distinct epochs, those in human and Earth history. They are merging into a single ending. The epoch of human history began 10,000 years ago with the origins of agriculture; that in Earth history began 55 million years ago with the last large-scale mass species extinction (mostly ocean-based) that inaugurated the Eocene. It is not happenstance that these two epochs are fusing as they terminate: The former (the epoch not just inaugurated by the "invention" of agriculture and formation of fixed positions in a separate sphere of production, but determined by the rise of the state and today structured and organized by the logic and movement of capital) has generated those conditions (primarily atmospheric heating) that is bringing about the latter which, in turn, will overwhelm (it is already occurring), that is, shape and determine, the terminus of the former.

Unfolding before our very eyes, it is this coincidence, the merger of the two epochs in their cessation... brought into being and quickened by the logic and, above all, the movement of capital, together with their monstrously unique content... the end of the geophysiological epoch heralding a mass species extinction, that of ourselves included... which creates for us a radically incisive, epistemologically privileged perspective from which the entire anthropological and evolutionary development of humanity, and this incorporates the very cosmological premises of that development, becomes, if not manifest, then evidenced and discernible, comprehensible and vitally necessary to reconstruct.

*Constituted anthropologically-evolutionarily, this necessity is existential, a dimension of the very being of man. The anatomic features formed in hominid development... upright posture, the consequent smaller pelvic opening... the physiological condition of an unformed being at birth and resulting absence of specialized drives or instincts, ready-made nature or innate moral guidance, the unavoidable post-natal socializing and humanizing development, all compel us, as humans, to form a precognitive "view" of the world that orients us practically in this world. Whether in fact any individual whatsoever actually undertakes such a reconstruction reaching back to the origins of man, the existential necessity to do so, to comprehend, thus to explain in order to orient ourselves as witnesses to and actors in the world-shattering genesis and formation of a new Earth, to illumine our activity by generating a self-interpretation extending from ourselves to our place in the totality, to nature (*natura naturans*) in its atemporal becoming, is given with and present in this epochal convergence.*

Preface
The Order of Nature

Among other things, the following analysis will make it manifest that responses to specific geologies, topographies and landscapes and changes in climatic regimes were decisive for the emergence of *Homo*. But merely to grasp these facts does not yet permit us to understand the significance of life in the evolutionary geophysiology of the Earth, and hence to do more than grapple with the meaning and import of contemporary, ongoing climate transformation. A first step in this direction is a complete break with the standpoint of bourgeois theory, the modern science of nature, for which nature is "physical," a coherence of forces in space (and time), forces that are grasped purely quantitatively as extended bodies. In a dialectically circular sense (i.e., on tacit evolutionary-anthropological premises which are explicit here), elsewhere we have demonstrated the necessity of this break.⁴¹ Here we shall simply take it as our point of departure.

Order in Nature

Climate change cannot be adequately understood if we do not begin our account from the geophysiology of the Earth as life underwent complexification with the development of plant life and as animal vertebrates evolved beginning 700-500 million years ago (mya). This itself is inadequate for, as we shall show, to comprehend the force, reality and significance of climate change we must reach back to the origins of earthly life itself with a view to what is distinctive and characteristic about it...

Earthly nature is a dynamically stable, yet evolving, self-differentiating and internally organized albeit limited totality, integrating different levels, orders and forms of being, beings that in their interactions generate novel forms and beings, augmenting earthy nature making it not merely a limited product (*natura naturata*) but also limitedly productive (that is, a productive moment of nature itself as unlimited, infinite productivity, *natura naturans*). Here, we shall stress order, and only then productivity and development...

Within the historical world of capitalism, it is not obvious that nature is ordered: The practical meaning and significance of nature assimilated, internalized and socially generalized in and through societal practices of accumulation... as matter (in modern science and capitalist technology) and as a raw materials basin for capitalist commodity production (for capital and technologies of capital)... is immediately given, as we said, in social practice; its immanent intelligibility is not. Cosmologically formed and integrated, this order will, however, assert itself (ironically perhaps in humanly unfathomable disaster generated by dramatic and abrupt, drastic climate change) against all unintended human efforts to totally remake it...

For us, the perspective of nature's immanent intelligibility is, of course, entirely consistent with and demanded by a reconstruction of the necessary premises of a being whose exists in nature and depends on that relation for its existence. So that prior to all reifying abstractions, nature is also a presupposition of distinctively human existence. As abiotic and as living, surrounding nature is possessed of an autonomy, cohesion, and otherness that is the basis of specifically human life. The presupposition of this natural coherence is sufficient internal diversity. This diversity includes among other things and relations, a variety of different climatic regimes and zones, a multitude of regional landscapes, and, centrally, a huge assortment of different life forms.

These are moments of that (earthly nature's) immanent intelligibility.

Earthly nature, as noted, is an evolving totality; but evolution itself does not just involve life: Whether based on gradual change or in its periodic geological moments of compressed rapid transformation, changes in life and abioticity as partial moments of earthly nature have co-evolved, are dialectically cause and effect of one another... are "tightly coupled" and inextricably bound together... and have not occurred in isolation from the rest of the total system of natural relations and processes we call Earth. Their very co-penetration and co-evolution has produced a gray area that escapes both determinations of life and inorganic being.⁴²

It, earthly nature, evolves through its own forms of development (volcanism and platelet tectonics, plate tectonic movement, continental growth, ocean openings and closures, orogeny, dramatic transformations in atmospheric and oceanic chemical compositions, etc., most if not all of which are mediated by, as they shape, the biota). It evolves in lockstep with the genesis of new forms of being and development within

⁴¹See *The Critique of Science*.

⁴²We are referring to viruses, RNA segments with a protein coating, which do and do not have the characteristics of life: They are capable of self-replication yet have no cell membrane, no organelles, no metabolic machinery, in other words, none of the other features that distinguish life at what otherwise appears to be its most basic level.

existing orders of being (e.g., living being), and novel orders of being that rise from the old, existing ones all of which transform earthly nature, but with the proviso that the new is never merely given with, existentially reducible to, or understandable in terms of, the old: Each new form and (in the broadest sense) each new order of being, for example, the earliest living forms, take up older forms (in this case, organic macromolecules that are not yet living), incorporate them and in this incorporation novelty emerges, but as emergent appears as a new principle of self-organization. So that, for instance, again in the broadest sense the interactions of abiotic, chemical constituents (elements of the inorganic order) of the simplest living being (a proto-prokaryotic cell, an element of the vital order) are determined by the specific relations and interactions that govern that being as itself, as such, not reductively in terms of those chemical constituents and their interactions. Similarly, humanity: "Man" is not an animal reality with the addition of consciousness, but rather a new order of reality, one that within itself reorganizes its own physio-chemical, vital and system of vital (organ) relations on the basis of specifically human principles of self-organization. In each case, through this integration and re-forming and reconstitution, dependency on the lower forms is transformed into the grounds of the autonomy of the high ones. These forms and orders are not just interrelated but intertwined each with all the others: It is in this sense we can speak of "life" as such as it has appeared on Earth; of life that stretches back to its beginnings and has existed in unbroken continuity for some three and half thousand millennia; of life that has co-evolved with earthly nature as it, the latter, undergoing enormous change over just as enormous periods of time, has evolved; of life (inclusive of humanity) that is inseparable, and cannot be separated, from this total context (earthly nature)...

The central feature of earthly nature is the biosphere, a moment within this self-regulatory whole (earthly nature itself), which together with other such moments (oceans, atmosphere, etc.) in their manifold and complex relations renders this nature autonomous, cohesive, and other in the totality of its expressions, levels or orders of being, that is, in its abiotic coherence, as living, and as specifically human, inclusive of their various intermediate gradations.

Taken together, the entirety of simply living beings at the Earth's surface (landmasses, oceans and lower atmosphere), i.e., the biosphere, is an active, adaptive and dynamic principle within this self-organizing totality, which maintains itself and its moments in balance precisely through the interactions of those moments (self-balanced as an integrated, concrete albeit limited or partial totality) ... For instance, the tropical zones receive an excess of solar insolation (by the time they reach the Earth incoming sun rays are parallel hitting the tropics directly, thus radiating more per unit area than at the poles which are hit angularly), while the poles receive a deficit. This imbalance creates an equator-to-pole temperature gradient, producing different atmospheric densities and pressures. These differences create a global pattern of air movements (modified by the distribution of the oceans and landmasses as well as Earth's rotation), which result in movement of excess energy away from the tropics toward the poles that thereby restores a latitudinal energy balance. Yet none of this makes full sense until we recognize with the microbial mediation, lessening its intensity, of incoming solar radiation, intolerably hot the Earth would not support aerobic life⁴³... The biosphere is, as self-regulatory (meaning cohesive), a subjectivity-less subject. (It lacks will and consciousness). Unlike the many and varied beings that are parts, moments of its being, it is not sentient; it, moreover, exhibits no conscious design, but nonetheless appears "alive": Through the total interactions of the various moments that form and comprise it, it regulates climate and its chemistry, and the various moments that depend on this chemistry (oceans, atmosphere, landmass) *in the interests of life in its current form itself, sustaining habitability*... Not only is this not "teleology," it is the only assessment that grounds and explains experience and observation⁴⁴ ...Here, again, the logic is

⁴³See *Capitalism and the Domination of Nature*, Part III, the final paragraph of "The Geophisiology of the Earth, VIII: Origins of Life, Ancestral Bacteria, Biological Diversity."

⁴⁴In point of fact, the imputation of teleology is a presumption.

In originally putting forth the "Gaia Hypothesis" (an anti-reductionist theorization for which the Earth is considering an evolving totality of physical, chemical and biological relations, events and processes in which life itself plays a central role and which aims at habitability or more precisely and concisely, the temperature and the gaseous constitution of the Earth's atmosphere are ordered by the life in its entirety, especially microbiotic life, of the planet at its surface), James Lovelock was criticized for the "teleology" alleged to inhere in such a perspective. With Andrew Watson (one of his former graduate students), Lovelock answered by creating a cybernetically conceived mathematical model of planetary temperature regulation. It is called "Daisy World." It is based on a singular life form, daisies of two species, white and black. White daisies as white reflect sunlight, black ones as black absorb it. All the criticisms of the model... starting from imputations, transformations of the model's initial assumptions and imposition of external standards of evaluation...

fail to come to grips with the following simple fact: The model demonstrates that growth of these plants, simply in respond to sunlight (too much or too little), produces temperature ranges within a narrow band that renders this simple

clearly dialectically circular, the whole (the biosphere) other than an aggregated totality: It has the logic status of a distinct order of being that does not and cannot exist apart from its moments (since its being as such is dependent on those moments), in which whole and parts, moment and totality are "forever" mutually penetrating and shaping each other, and in which a specific form and order of life, humanity, has now become dominant.

It should be stressed the biosphere, like the totality that is earthly nature, is not life alone to the extent it incorporate its own premises, the atmosphere, oceans, soils and landmasses that immediately and directly support life. Abstractly, it includes the abiotic (non-organic) that interacts, chemically, with this non-living world or environment (*Umwelt*) setting firm constraints on the whole, with the determinant moments, in the language of bourgeois science the "major partial systems" so-called, themselves also functioning within limits (e.g., levels of ocean salinity and acidity, atmospheric nitrogen and oxygen contents, upper and lower limits on temperature), and setting constraints and creating conditions within and as part of other moments such as rain forests which create and maintain elements of the atmosphere, clouds, and thus rain, above their canopies...

In all these reconstructions, earthly nature is in the end determined cosmologically (by its orbital cycles, by the "life" expectancy of the sun as a moderate sized star) in its relation to other heavenly bodies (first and foremost, the sun, then Jupiter) that exist in the order of the universe, cosmologically. The only significant manner in which human activity, to the extent it would become utter "entropic" and destructive, will ever be determinant for the whole of earthly nature would come to pass only if that activity were to render the Earth uninhabitable, unfit for life as we know it, a dead planet.

Elements of a Phenomenology of the Essential Forms of Life

"What is man?"

Preliminarily, we can offer a response to this now longstanding standard question starting from the conventional, albeit highly truncated method of seeking to uncover, if it exists, such difference in comparison of man to animality. The method is exceedingly limited: For, we do not just undertake this search with a view to a *species differentia* with regard to animality, but *in terms of our relation, perhaps unique, to the universe as a whole*, which we shall hereafter refer to as the being of nature, or simply nature. (For us, nature is coexistence with the universe.) If we emphatically answer in the affirmation that man as a being in nature is different in essence from animality as a whole while all the time remaining a being in nature (and similar to animality), we can, again proceeding conventionally by beginning from the most primordial and basic forms of living being, seek to discover what is characteristic of vital forms of existence, say, in contradistinction to the inorganic, abioticity. That is, *basing ourselves evidentially on a critical reflection on and appropriation* of the results of the studies of the sciences of life, in reformulating those conclusions we can attempt to disclose the essential forms typifying the various gradations and phases of vitality as it appears in nature (assumed nature as it exists here and now, and without determination by way of how nature and the organic as it might be paleontologically reconstructed in geological time). This we shall refer to as a *veritable phenomenology of fundamental forms of vital nature*.

Unlike all other vital forms of life which interposes their nutrient, growth and reproductive requirements between themselves and their environments, man interposes meaning generated in and through activity between herself and the world, for she has no specific environment at all since that world is created in the objective activity of large-scale groups of men and women. This is, however, a strictly human determination, merely provisional (and perhaps mistaken), for an essential difference between humanity and all other forms of life cannot be justified on morphological, physiological or even emotional-psychological grounds.

Instead, for all forms of life except the microbiotic physiological aspects and psychic aspects of a living being are two features of the same reality, two manners of description. They are fundamentally, as Scheler has argued, "strictly identical in an ontological sense. They differ only as phenomena." Neither process is mechanical, both are oriented to a goal and are holistic. While psychic processes are more unified and goal oriented the more primitive they are, hence the closer they are to or the less distinguishable they are from what appears as physiological, both processes are merely two moments or aspects of life processes. They are unitary, non-mechanically organized with respect to structure and

model's atmosphere dynamically stable, fit for life (here the daisies), merely as a product of well-known biological properties as organisms. No teleological imputation is necessary. (Andy Watson and James Lovelock, "Biological Homeostasis of the Global Environment: The Parable of 'Daisy World'" *Tellus*, 35b (1983): 284-289).

interaction.⁴⁵

This is the basis for going far beyond bourgeois science, for the latter the relations of two moments of the same being have not only been held apart, but have been declared ontologically separate. It is on this unitary ground that the dimension of what is novel in man as humanly nature, as a being in nature, will appear and stand out. Those features (that are novel) pervade, reorganize and reshape the whole being of man, for she has made them. They are, and render this being irreducible to, for instance, the "merely" organic (not to mention the inorganic or, in the language of bourgeois science, physio-chemical processes as they transpire, say, in the brain): These novel features of human existence as they appear in man as a being in nature form new principles of self-organization that restructure her being and reintegrate the "lower" forms of existence (microbial, vegetative, animal and hominid) as they otherwise inseparably characterize her.

Proceed, then, to these forms as they essentially appear in nature.

Beginning with the "lowest" and moving to the "highest," we single out five forms, primordial metabolism, vital feeling or drive or impulse, instinctual, habitual and practical intelligence.

By *primordial metabolism* we are referring to microbial forms. Here we mean and intend those which are not visible to the naked eye, which require the resolve power of the microscope to see. Cutting across various existing and recognized biological divisions, these forms include non-nucleated prokaryotic (archaea, bacteria) and nucleated eukaryotic life, single (protists) as well as multi-celled organisms. What is characteristic of life of this order is neither speciation (since non-nucleated microbes don't speciate and don't reproduce sexually) nor expressiveness (see below), the latter being a feature of visible life.

Instead, it is the functional unity of all internal organelles, and their *full integration into "pursuit" of the vital values of self-maintenance, self-reproduction and self-enhancement (entailing self-regeneration meaning capacity for self-healing and repair, and self-ordering autonomy meaning a capacity for internal structural change which preserves forms and patterns of the organism's vital organization)*. These vital-values first appear with *primordial metabolism* and are characteristic of all forms of life or living "systems." All forms of life exhibit internally generated behavior, even where this behavior is not action, that is, is not consciously mediated (even where this consciousness is only animal sentiment of self.)⁴⁶ In a dialectically circular manner itself characteristic of life, *behavior is always mediated by an internally generated, self-organizing structure, which, in turn, is grounded by the tel⁴⁷ of preservation and self-maintenance in the interests of renewal and self-enhancement of the organism*. Here, in the order of primordial metabolism, functional unity and full integration are achieved, of course, without consciousness, but unlike the higher form of plant life, it is accomplished through motility (but without sense organs and, *only* in this sense, without sensation).

In its most archaic form, primordial metabolism consists minimally in a cellular membrane. In the continuous chemical exchange across that membrane (i.e., in metabolism) the cell develops: It becomes increasingly multifaceted with a capacity for self-maintenance and consistent self-reproduction, thus self-enhancement. In geological time, it had become *autopoietic*, that is, it was able to maintain itself, its structure and organization in the face of dramatic changes in its milieu. This independence is the *sine quo non* of all vital existence.

Starting from the basic identity of the physiological and psychic, *each of the remaining forms, orders or "levels" of being can be examined from the standpoint of their unity as modalities of behavior*.

Characterizing plant life in its entirety, the most primitive form of visible behavior is *vital feeling, drive or impulse*. Being and behavior in this form, life at this level, though absent sensation, consciousness, and representation, is the power, force and energy underlining every activity at every higher level and with each order of life, and beyond this, Spirit (humanity) also.

At this level of life, feeling and impulse are undifferentiated. Here we shall speak of impulse. It always has a determinant direction, toward something, an objective though not an object (since as we shall see its environment is largely, but not entirely unitary) such as nourishment. Though incapable of movement through space (the plant is after all rooted to the soil), there is nonetheless movement in the sense that

⁴⁵"Der physiologische und psychische Lebensprozeß sind ontologisch streng identisch.... Sie sind nur phänomenal verschieden..." Max Scheler, *Die Stellung des Menschen im Kosmos*. München, 1947 (1928): 68 (citation), 16-17, 74. In the following discussion, we shall draw heavily on this work.

In respect to this identity, Scheler indicates that phenomenologically, the organism's physiological processes are just as meaningful as those that are conscious, and the latter just as blind as the organic process.

⁴⁶The meaning of animal sentiment of self will become clear, below, in the course of this discussion.

⁴⁷Plural form of *telos*.

impulse orients plant life toward light or away from a state of suffering (absent a specific object).⁴⁸

In this sense we affirm impulse expressed in its most primal form in plant life is a behavioral manifestation of being *in and for itself*. This expression means primitive feeling, it does not and is not intended to suggest that plant life has sensory organs and an ability to respond to specific stimuli, instincts, condition reflexes or associative memory, or a capacity for reporting back to a center. (This much said, to cut down or destroy a plant is to murder it, deprive it essentially and forever of that being in and for itself.) Thus, we find in plant life the phenomenon of expressiveness in the original sense, the outer manifestation of a certain "physiognomy" of its inner states, for example, feeble or vigorous, poor or luxuriant.⁴⁹

None of those features of "higher" forms of life such as a sensory apparatus, instincts, mastery of an environment through behavioral repetition and so on are expressed in impulse behavior. These very absences wholly condition plant life and its essential structure must be grasped without regard to them. If to the contrary the plant had any of these features, it would of necessity have all those others linked to the specific form of vital life that said features characterize.

The plant does not respond to a specific stimulus, rather to the total situation within the environment within which it is rooted. Thus, it moves up and down, not in specific directions but only indiscriminately toward, say, the light. In this sense we say impulse is vegetative, meaning it is essentially oriented toward that which is outside it. It does not have sensation, hence no specific memory, just its present dependence upon its life history in its entirety.

Finally, the plant is not simply, in an unrelated fashion, set down somewhere (say where a seed has blown or taken root). It is functionally and operatively a part of its local ecology, meaningfully related to the inorganic substances that it assimilates, the insects and birds that visit it, derive nectar from it, pollinate it, build nests in it, etc.

Instinct is unquestionably an expression of a more developed, more "advanced" form of behavior than vital feeling (and less developed, more primordial form of behavior than the reflex).

Instinct is characterized as, first, a purposive relation of the organism as a *whole* to the environment (e.g., with regard to nourishment). Such behavior may not relate to the current moment: Any number of migratory birds prepare for winter by qualitatively expanding daily time consumed in feeding for a period prior to flight. Second, instinct must exhibit a well-defined, unchanging rhythm. Here emphasis is on rhythm, not specific organs engaged in this or that behavior and not movements or combinations of movements. In either case, these may change, depending on the nature of the relation to the environment. Rhythm is consequently non-mechanical. Third, instinct is a behavioral response to typically recurring situations that are of import for the being and existence of the species and not for the individual and its experience. This, it should be noted, clearly distinguishes instinct from behavior based on learning by trial and error (associative memory) or self-training (fully conscious behavior). Thus, instinctual behavior is never a response to unique or even specific features within the animal's environment, but always to those features that are typical for the species, hence, to a structure, a set of representative features, that are apprehended by the animal. (This is the situation that instinctual rigidity refers to.) And, thus, instinctual behavior is always a part of the development of the species as a species, and even when mediated by habit or training partial changes in the instinct do not essentially transform it. In this regard according to Scheler, in its purest forms it does not change, period.⁵⁰ (For reasons indicated in the summation below, we are far more dubious.) Fourth, it follows, more than less, that instinct is complete from the moment it first appears. It is, then, independent of any number of attempts the animal undertakes to cope with or handle a situation. Lastly, with respect to behavior instinct is innate and hereditary. This, however, does not mean the instinct is present from birth, only that it is necessary linked to fixed phases of development and maturation and, we also add, it does not preclude a certain amount of learning which every species individual must engage in. (Watch a song bird build a nest, both within a single season and from one season to the same season the following year. With a view to shape, size and species of tree, it learns what twigs are best for its construction.) But learned behavior is not hereditary transmitted. Each individual must learn anew. In this regard, instinct is assimilated to the morphogenesis of the species as a living organism while differentiation is assimilated to the individual. As behavior, instinct is also closely tied in the operational sense to the physiological functions and

⁴⁸Scheler, *Ibid*, 12, remarks that states of pleasure and suffering (pain) are the only two forms of primitive feeling experienced by life at this level.

⁴⁹Expressiveness (*der Ausdruck*) is, as Scheler points out (*Ibid*, 14), *sui generis* (our term) feature of life first appearing, again, at this level. It is not as Darwin would have had it, the outcome of a primitive *adaptation*.

⁵⁰*Ibid*, 19.

processes that morphologically, anatomically and skeletally shape the animal body.

Associative memory, i.e., *habitual behavior*, is the next (immediately "higher") form of vital self-organization. It is noticeably distinct from practical intelligence as the "highest" vital life prior to the appearance of man. For, what emerges in practically intelligent behavior, individuality, is submerged in the species-oriented habitual behavior. With the former only, the situation or circumstances that are to be grasped, and mastered, are at once new and atypical for the species; and, of course, for the individual also. Associative memory encompasses association, reproduction and the conditioned reflex. It is attributable to all living beings whose behavior is slowly and constantly transformed on the basis of earlier behavior with a view to useful and purposive ends, where progress toward this end is exactly decided by the number of trial attempts. In repeating those movements that successfully reproduced the goal given by a drive, producing positive gratification, the movement itself becomes fixed. This is habit. Associative memory is that drive determined immediate recognition that this situation with this goal requires this behavior. Habitual behavior and associative memory are inseparable.

Now in this respect, experimental animal psychology (the name linked to these studies is Pavlov) demonstrates that the conditioned reflex underlies all associative memory: If we sound a signal simultaneously with behavior produced by a special stimulus, and do so repeatedly, the same behavioral responses will occur by way of the same signal without the appropriate stimulus. This is the conditioned reflex.

The psychic correlate to and expression of the reflex, associative memory is not abstract, pure or without context and motivation: It is surely not the basic law of mental life.⁵¹ It, this memory, is fully subject to drives, to biological needs which we in a general way say consist in self-maintenance, reproduction and enhancement of the organism, and the objectives or tasks established by these needs. This principle is a consequence of the emergence in nature of (conditioned) reflex behavior or, stated differently, of the separation of the sensory from the motor system. Obviously, a vast series of gradations of animal species exist in which this reflex behavior functions occurring most commonly among vertebrates and mammals; and among the latter at least, it rests largely on imitating and "copying" behaviors. In the sense that these two forms link animal behavior with the past life of the species, a novel biological consequence is establishment of a "tradition." Emphasis, though, is on the species: While the associative principle (effectively, the conditioned reflex) increases both the centralization and the accompanying autonomization of organic life (they go together), and thereby removes the individual more and more from the burden of and submersion in the species, from the inflexibility of instinct (because it is with this principle that the individual begins to adjust itself to new situations untypical for the species), bondage to the species has not been broken. It is only and finally with man that consciousness of the uniqueness and specificity of the event forms, that continuity throughout a manifold of memories that constitutes a single past takes shape.

As behavior, *practical intelligence*, and here we offer an exacting determination, requires an organism must be able to respond, without trial or error, to a new situation meaningfully, whether in apparent folly or ingeniously. This means that the animal aims at an objective, but can miss it or, alternatively, can achieve it *without* reference to any number of previous efforts. In this regard, practical intelligence will come into relief in our discussion of primate behavior in the main body of this text.⁵² The objective, goal or problem to be solved is drive-determined and, as practically intelligent, the organism always actively pursues a goal posed by its drives that it either achieves or fails in obtaining.

If we consider just one aspect of unitary vital life, the psychological, we can state that intelligence is insight into a state of affairs, partly on the basis of a structure of relations whose elements are experientially grounded, and partly on the basis of expectation in the animal cognitive sense (i.e., not "psychologically" or "emotionally," but in awareness as is peculiar to the animal).⁵³ For anyone who has ever *experientially* developed a relation to a domesticated animal (horse, dog, cat, etc.), this expectation, call it an anticipatory representation that is manifested in behavioral expectation (of e.g., food, a walk, a lap, etc.), is difficult to deny. Yet it is completely absent in physiological models and examinations of

⁵¹As Locke, Hume and Mill all maintained.

In this regard, Scheler (*Ibid*, 25) correctly criticizes British empiricism, noting that like the laws of physics so-called, the "laws" of association only describe statistical regularities and have precious little to do with the cognitive character of human consciousness as indicated in our formulation which will be developed in full in the course of the following discussion.

⁵²See *Origins of Man*, Part II, "Animal Society (Primates)," below.

⁵³As animal sentiment of self. See *The Appearance of "Spirit": Modern Man, Her Specificity and Her Place in Nature*, below.

animal behavior: It is excluded in principle from analysis and rejected by the so-called contemporary sciences of life on the basis of an unexperientially grounded theoretical, usually mechanistic, *construction*.

In this context we can further note an exemplary feature of practical intelligence; namely, the specific, active relation between drive-projected object, the object itself and the structurally changing relational field of drives and affects as they form sensory-motor awareness: A piece of fruit suddenly appears in the visual field of a monkey. (It is put there by us). The fruit immediately stands out, appears at it were as an independent object, and all of the objects in the environment are peculiarly restructured, especially the visual field between the animal and fruit. The field is objectively reorganized, the structure of the relations of objects to one another within it and constituting it, appear different: The objects within that field now appear as something-with-which-to obtain-the-object, the fruit. And, it is not just objects, say sticks that are similar to branches or sticks as they may appear in the monkey's original arboreal milieu, but any object, in the case of a captive monkey, a piece of wire, straw or blanket (employing Scheler's examples),⁵⁴ anything satisfying the intuitively immediate understanding of that which is movable and lengthens reach. Otherwise, objects in the animal's visual field are largely irrelevant, at best background. What is usable, though, takes on "the dynamic functional value of an instrument" that will bring the fruit nearer. It is obvious (or it should be) this transformation of the animal's sensory-motor field is not conscious, reflective activity.

Summarily, we shall note three limitations of this analysis.

First, as we have already suggested, instinct is less rigid or more "plastic" than what is indicated in our earlier account. In daily life, in fact, it is sometimes difficult to see the distinction between human practice and animal activity. They are less than absolute. (But then this makes sense only if nature and society co-penetrate one another.)

Second, in the nature in which it largely appears among "higher" primates (i.e., in the tropical zones of the world with its abundance of edible plant forms) the limitations to practical intelligence are set precisely by the absence of a necessity that would compel this intelligence to go beyond itself. This gives the appearance of "lower," *fixed* levels of cognitive and practical capacities than practical intelligence in its plasticity can elaborate for itself. For example, in captivity that reproduces the natural conditions (terrain, plant life, climate) of animal life, social interaction, sexuality and cognitive abilities in bonobos (and other species as well) all dramatically expand.⁵⁵

Third, the distinction in particular between practical intelligence and human practice as it evolutionarily developed was not fixed. What permits us to treat it as such is the disappearance of all those hominid, archaic human and human (i.e., Neanderthal) species from the face of the Earth. For it was in this evolutionary development that the distinction and the difference it signifies slowly was made and formed.

⁵⁴„Der betreffende Gegenstand, den das Tier gebraucht, erhält den (allerdings nur okkasionellen) dynamischen Funktionswert eines ‚Werkzeugs‘, eines ‚Etwas zur Annäherung der Frucht!“. Scheler, *Ibid*, 32 (examples and citation).

⁵⁵Franz de Waal and Franz Lanting, *Bonobo: The Forgotten Ape*. Berkeley, 1997.

Introduction
Why the Study of Human Origins
is Necessary to the Critique of Science and Inseparably that of Capital

Ranging from creation myths of various sorts to the modern, rationalistic and reductionist explication of a humanity extruded from nature, the daily culture of all communities and societies with which anthropologists and ethnologists have come into contact with offer (a great variety of) accounts of human origins and the human community. Is this mere coincidence? We do not think so. But unlike almost all major currents within contemporary revolutionary thought, we also think it is a necessary, essential and distinctive feature of any form of human sociation. We shall develop why this is the case, and we shall start by way of a criticism of one such current, or at least one of its leading proponents who has thought through this question. This current is communization (communisation).

What is at Issue in the Examination and Analysis of Human Origins

In its most coherent formulation... and by coherent we mean that not only is this thinking evidentially grounded as a reflection on the historical development of capital, that it is internally consistent as a form of thought, but that it also thinks back to and reflects on its own most basic assumptions, on what it means to be human... this reflection on origins is cut short, it is incomplete and denies the very possibility of thoroughly thinking through these assumptions: "Why does man distinguish himself from his own immediate activity? It is a question that can no more be answered than the question of why a new species appears with its own characteristics. But it's the foundations... on the basis of which everything else is [i.e., all human objectifications are] generated."⁵⁶ Once the specificity and distinctiveness of "man" is established (i.e., asserted), questions of origins are rendered gratuitous, they are of no concern and need not, indeed must not, be raised: "Posing the question 'why man?' is of just as little significance for us as the questions, 'why the monkey, why the amoeba?' What matters is that at a certain moment a species in nature appeared that distinguished itself through its own activity. From that moment we take our leave [of nature]: All the anterior natural evolutionary processes do not concern us."⁵⁷ Because the establishment of "sa propre activité" inaugurates historical development, questions of the relation of humanity to nature are rendered superfluous.⁵⁸ This viewpoint raises the question as to whether, once man appears, all nature is separated from her by a chasm ("his own self-productive activity") that cannot be crossed. Is man really "in" nature, of nature, a part of nature? Going beyond bourgeois in nearly all its modalities, nonetheless for this communizing form of thought, the question cannot be posed: It is not permissible and it is meaningless (though a negative response will in fact be given, as we shall see).

There are three issues here.

The first concerns whether we, as humans, can achieve decisive insight into nature, its structure, organization and its dynamics. The second concerns whether the difference between man and nature is so great that our separation from nature is virtually absolute, in other words, whether with the appearance of man in nature the break in the natural continuum is so radical, that man in "essence" is entirely novel, distinct and unique.⁵⁹ The third concerns whether, as humans, our origins are of any

⁵⁶"Pourquoi l'homme se distingue-t-il sa propre activité immédiate ? C'est ne question à laquelle on ne peut pas plus répondre que celle de savoir pourquoi une nouvelle espèce apparaît avec ses caractéristiques propres. Mais c'est là la donnée de base... à partir de laquelle tout le reste doit être produit" (Our translation). Bruno Astarian, *Le Travail et son dépassement*. Paris, 2001 : 37.

⁵⁷"Il nous importe tout aussi peu de poser la question 'pourquoi l'homme ?' que 'pourquoi le singe, pourquoi l'amibe ?' Ce qui coûte c'est qu'à un moment apparaisse dans la nature une espèce qui peut se distinguer elle-même de sa propre activité. C'est de là qu'il nous faut partir. Tous les processus naturels évolutifs antérieurs ne nous concernent pas" (Our translation). *Ibid.*, 35.

⁵⁸"A partir de là, il n'y a plus à parler d'évolution naturelle, mais d'autoproduction humaine, d'histoire." ("Henceforth, there is no more talk of natural evolution, but of human self-production, of history.") *Ibid.* While in one sense this is correct, it is also badly mistaken as we shall demonstrate in the course of this essay. Moreover, contextually "mais d'autoproduction humaine" has the sense of "but only of human self-production," which, as we shall also demonstrate, is doubly mistaken, i.e., reinforces and deepens the original inadequate assessment of the relation of man to the nature she is embedded in.

⁵⁹"Quelle que soit la longueur de l'évolution naturelle qui a amené l'apparition de l'homme, quel que soit le nombre des étapes intermédiaires entre le singe et l'homme, il n'en rest pas moins que l'apparition de l'homme dans la nature constitue une rupture avec tout le continuum naturel qui l'a précédée. L'homme apparaît-il subitement, par une énorme mutation portant d'un seul coup sur l'ensemble de ses caractéristiques, ou bien y a-t-il de nombreuses 'tentatives' ? Peu importe : l'apparition d'une espèce ayant les caractéristiques fondamentales de l'homme (nous allons y venir) constitue une rupture. Avant cette rupture, il n'y a rien qui soit équivalent, ou proche, ou ressemblant à l'homme dans son essence. Toutes les philosophies qui s'attachent au contraire à mettre en évidence la continuité entre le règne animal et

import to us which immediately devolves on the question of the status, nay the meaning and significance, of nature for human existence as human, for man.

First issue.

Can nature be known? And in what sense?

These are in part epistemological questions and we shall provide, in part, an epistemological response.

In a rigorous theoretical sense, there is error in simply asserting knowledge of nature is immediately and directly accessible, that nature is simply given, there to be observed and recorded. The error consists in taking for granted without further question or thought that the world (where this term signifies the totality, man, nature and man in nature, nature in its entirety, the "universe") exists or has being both independently of and prior to us as humans, of and prior to "man."

This assumption is largely a function of work and life under conditions of capitalist production in which human activity (work) and its product are estranged from the producer, call it naïve realism. It is logically indefensible, and if held explicitly and positionally is speculatively metaphysical ... for two reasons. First, in making the assumption, we abstract from ourselves: We postulate ourselves, the very being who so naively believes, as non-existent: The assumption is independent of any and all possible observational frameworks, or in our terms, it is independent of the experience of any possible subject. Raise the assumption to consciousness, give up the abstraction and the assumption also disappears. Second, in making the assumption we also abstract from our own development in its entirety, that is, from our "metabolism" (*Stoffwechsel*) with nature (the term is Marx's),⁶⁰ our interaction with earthly nature in and through labor, work and activity which shapes us and shapes surrounding nature, and which has rendered us, our built environment and surrounding nature, indissolubly linked in each and all of their manifold and various forms, the outcome of the entire previous history of labor, work, and activity. In making the assumption we, as it were, posit a nature in itself, a nature whose meaning and being is separate and detached from, hence independent of, the entire history of the interaction on the basis of which we have come to know it in the first place.

In this respect, there is a bourgeois tradition... it is neo-Kantian (Windelbaum, Rickert, Lask) ... that holds that nature can never be known in the manner in which "man" knows himself. This tradition is not subjectivist: It does not hold that nature cannot be known, merely that *its origins and the inner dynamic* that organizes its forms and structure are unknowable. The fundamental distinctions operative in these two kinds of knowledge are space and time, nature and history, what merely appears and is naturally given and that which we have made. That fundamental distinction, in other words, lies in the conviction that an essential self-knowledge of man is achieved in and through her objectifications, the materially and socially formed products of her own activity and thought. The phenomenal domain of nature, on the other hand, is the province of bourgeois theory, the modern science of nature. Nature, nonetheless, remains "essentially" impenetrable since the dynamic of its development is not accessible to us (i.e., we have not made it). Materialist in Marx's sense (or at least in the sense of his *Theses on Feuerbach*), Astarian's position, for example, is grounded in this tradition. (Marx did not pose the question of a "nature prior to man," but had he, he would have been forced to take a position on its essential knowability.) For Astarian, to pursue knowledge of nature "essentially" is to "naturalize" man: Yet the reason this is so "degrading" is because Astarian conceives nature in the common bourgeois sense (albeit largely non-scientifically), e.g., he thinks that where it exists animal sociality is merely gregariousness and not based on social relations constituted among members of a group, that only humans engage in active self-production, etc.

Where his formulations rise above vulgar prejudice he reproduces concepts concerning nature that originated with bourgeois philosophical reflections on the modern science of nature, e.g., natural beings

l'homme partent peut-être d'observations réelles du monde animal, mais n'atteignent pas l'homme dans sa réalité essentielle et en défendent une représentation dégradée, voire dégradante" (Ibid, 33). "Whatever the length of the natural evolution that has permitted man to appear, without regard to the number of intermediate stages between ape and man, the fact remains that the appearance of man in nature constituted a rupture with the entire natural continuum that preceded him. Did man appear suddenly, an enormous transformation of all of his features, or are there many 'attempts'? No matter: The emergence of a being with the fundamental characteristics of man (as we shall see) is a break with all that has gone before. Prior to this break there is no equivalent, nothing approaching or resembling man in his essence. All philosophies that instead focus on and highlight the continuity between the animal kingdom and man base themselves on actual observations of the animal world, but do not reach man in his essential reality and defend a degraded and degrading representation" (our translation).

⁶⁰Karl Marx, *Das Kapital. Kritik der politischen Ökonomie. Erster Band. Buch I: Der Produktionsprozeß des Kapitals. Fünftes Kapitel. 1. Arbeitsprozeß.* Marx-Engels Werke, Band 23. Berlin (DDR), 1962: 192, 198. Hereafter citations from this edition, chapter and section of volume 1 will appear as *Kapital, I, 5.1.*

are "en soi."

In a scientific sense, this position is indefensible and irrational, i.e., it is idiographic and non-comparative, compelling theoretical analysis to center on a single event, human origins, and then, to boot, abandon the account because those origins are deemed inexplicable. Since science (the modern science of nature) offers only physicalistic reductionism and naive realism in resolution to this problem, it has its own intractable difficulties.

There are in opposition to this, Astarian's perspective, nonetheless, two sound reasons for setting about an account of a "nature before man" (and in this sense exclusively, a nature independent of man), call it an "earlier nature."

Consider each in turn.

First, there is a large mass of evidence which permits us to affirm an earlier nature: It points to the anterior existence of an enormously long geophysiological history of the development of the Earth. This development entailed various stages and phases which preceded that moment where a man-nature interaction, and the relation formed on this basis, first took shape. Though, like all evidence of this sort, it is not logical but sensible yet conceptually mediated. Thus, it is not direct, unequivocal and immediate (as, for instance, the type evidence I invoke when I step outside, and looking up into a cloudless clear sky at mid-day, and say, "The sky is blue and the sun bright"): While this evidence is often perceptible (e.g., tactile and visible), such as provided by tree rings or stratified, compacted layers of rock, though in many cases its sensible or perceptible aspects are not even immediately present (for example, plant sediments at lake bottom which must be removed, separated from encrustations and other deposits, perhaps cut open), the meaning and significance of this evidence is conceptually interpreted and heavily "theory laden."⁶¹ The interpretative framework nonetheless is "objective," that is, it is accessible and two or more persons will accept it as long as the formation of those persons has unfolded within modern bourgeois culture and capitalist society. This raises the question of our attitude toward science, to which we shall return shortly.

Second, in a logical sense an earlier nature is given (and given in the strong sense, i.e., unavoidable) in the recognition that we, as human beings, are not independent and self-sustaining and do not exist alone in a world in which we would see ourselves as if in a mirror: Our autonomy is limited and based entirely on the extent to which we have formed a "second nature" of objectified and materialized substances (speaking crudely, built environment) that are in their original forms nothing other than *natura naturata*, limited products or natural being, which themselves point or refer back to a more fundamental dependency. Simply as a premise of this sort of being, such recognition compels us to query, and reasonably so, "What are the conditions in nature that made our existence possible?"

There are actually two more reasons for considering a "nature before man," both of which we shall take up and discuss in the third issue below. Instead, here we shall redeem a promise, for we are at any rate required, to state our attitude and orientation toward science. That attitude is critical. We think one takes away from it what one can, and this is done by judiciously and discriminatingly integrating whatever insights it offers into a historical, materialist and dialectical (yes, dialectical) theory of nature and society.

At the same time, it is absurd to hold that knowledge, especially in its formal variants and forms, arises on the ground of social practices, then to assert that science... the science that we know as "science," that for which methodologically and epistemologically the historically refined mechanics of Galileo and Newton serves as a model for cognitive activity and investigation of phenomena... is universal, historically transcendent, the patrimony of humanity. That is unintelligible nonsense. As a coherent perspective on the world as a whole, as theory in "grand" sense, the modern science of nature is class theory, it is a systematic knowledge of the world that is grounded in bourgeois life practices (accumulation). It was forged in a social struggle against the old order kingship (at different sites and

⁶¹This evidence as it related to a "nature before man" is generally called proxy data.

A proxy, or proxy data, is a quantitative relation, a measurement that provides indirect evidence where the measurement cannot be made directly. Proxies, then, are substitutes for contemporary instruments of measurement (those as seemingly simple as thermometers and as complex as computerized data returned from satellite photography) permitting inferences, for example, concerning dating, ancient temperatures, and past atmospheric and terrestrial conditions. While more direct evidence (in the case of dating) is provided by tree rings and radiocarbon dating, well-known proxies include rock stratification and sediment layers found in lakes and bogs. Equally important proxies include pollen, skeletons of tropical coral reefs, and ocean sediments. Other, perhaps less well-known indirect forms of evidence are derived from hydrogen, oxygen and carbon isotopes as are found in the calcified skeletal remains (the shells) of ancient sea life, microorganisms (diatoms and foraminifera), and in old ice (high latitude and polar ice cores). Of course, the remains of *Homo* in its various speciated forms, as well as materialized objectifications of its behavior (e.g., tools, middens, encampments), though requiring temporal contextualization, obviously count as direct evidence.

times in western Europe) and against the order's theory, Aristotelian (Peripatetic) natural philosophy. Its internal conceptual organization is homologous with the structure of the value form; and it is comprehensive meaning and aim, its telos, is the domination of nature, a domination that is inexplicable unless it is explained in terms of the historical role of the bourgeoisie, namely, endless expansive of productive forces.⁶²

Return to the (epistemological) question that opened this discussion: "What is the status of an account of an earlier, earthly nature?" Any account of an earlier, earthly nature (extending logically, and if necessary, all the way back to its cosmological presuppositions) based on the evidence described above has the epistemological and logical status of an ideational or theoretical reconstruction, an evidentially mediated conceptual effort to reach back to and ideally recreate (i.e., generate in thought) those conditions that absent the very being those conditions have come to support nonetheless appear, in and to that thought, as necessary premises of a being whose exists in nature and depends on that relation for its existence.

Such an account, then, must begin from a determinate position, a partial, socially subjective, given position, the perspective of a situated awareness that is formed within human historical world as it unfolds within the ideally reconstructed totality of the evolution of earthly nature situated cosmologically.⁶³ Our opening discussion to *The Materialist Dialectic*, above, is a precise statement of such a situated awareness.

Second issue.

The second issue concerns the difference that separates man from nature, and the character of this separation itself.

Determination of whether "man" appears suddenly or "his" emergence in nature is marked by several attempts is both relevant and important. "L'homme apparait-il subitement... ou bien y a-t-il de nombreuses tentatives"? Peu importe.⁶⁴ Peu importe? Au contraire, it does matter, and for three reasons: Above all, (a) the "rupture" has to be specified, evidenced and demonstrated (i.e., ideally reconstructed) and only then can it be "seen" whether we are talking about a radical break. Yet this is only possible through an account of the preceding development leading up to the rupture (we shall return to this momentarily). (b) In the case where the break was not absolute (which is another way of saying there are transformative differences in quality but no unbridgeable gulf between man and the rest of nature), we must nonetheless specify wherein the differences lay, but not vulgarly (as Astarian does) as a *species differentia* but as a way to be. (c) In which case we can grasp, explicate and arrive at a real comprehension of what, in nature, is unique in man and at the same time renders her humanly nature, in nature, of nature and distinct yet a part of nature.

Each "stage" in the development of man is not simply the result of the addition of a new feature to an existing animal form, which in turn cumulatively constitutes man as she originally appeared: Each and all of the various "stages" in this development with its "branchings" and dead-ends constituted a novel form in nature, ones which must be understood on their own terms and which cannot be adequately explicated solely in terms of previous development; for, the principle of explanation, hence the intelligibility, of that new form derives from the reorganization of the entire being of this form, this new species, on the basis of this new feature. Each new form establishes itself, its difference, its specificity and its identity, in a word, its autonomy vis-à-vis other forms, on the basis of its dependency on the other forms and its entire anterior development. In our reconstruction of the totality of natural movement, and in particular of the evolutionary development of life on Earth, this is a general principle of the intelligibility of natural phenomena: Each new development within nature has to be grasped and explained immanently from its own structure and organization because it is precisely the novel characteristic that, in appearing, only establishes this new being on the basis of this transformation and reorganization of structure and arrangement. Call it the principle of integrative levels. Against its congenial reductionism, in its own way (i.e., tacitly, insufficiently and unsatisfactorily) the science of evolution including physical anthropology recognize this: In its taxonomic classification, a new development within a genus is called a species.

But it is this reorganization and re-structurization that admits only of a new principle of intelligibility that is at stake: It cannot be understood apart from and in contrast to what preceded it. So that, for us, man is a being in nature, of nature, is nature, humanly natural: The features that makes man distinctive do not just

⁶²See *The Critique of Science*, the Introduction, First Study; and Capitalism and the Domination of Nature, "Capitalist Criminality."

⁶³We do not hesitate to state our position in this respect, it will have to wait. See Part V, "The Constitution of Spirit within Nature," below.

⁶⁴See n. 18, as well as the text it references, above.

stand out in contrast to those features that characterize other forms of being in nature, but those very distinctively human features are not intelligible without working through the entire evolutionary development upon which they were established.

"Impatience seeks to attain the impossible, namely, reaching the goal without the means of achieving it. To one side, the length of this journey must be borne, for each moment is necessary, and, to the other, we must dwell with each for each itself is an individual, complete form and can only be finally and definitively regarded insofar as it is determined as a whole or concretely, insofar as the whole in its specificity is determined."⁶⁵ This determinateness in its fullness and completion cannot, then, be reached abstractly, i.e., immediately, but instead requires it can only be won through the process of its elaboration: "The truth is the whole. The whole, however, only exists in its fullness through the process of development of its completed nature."⁶⁶

Third issue.

The third issue concerns the place and role of man in nature and the totality (i.e., in society as it is itself situated in nature in its endless atemporal becoming). Above, we indicated we had further reasons why we, as humans, can achieve decisive insight into the structure, organization and dynamics of nature.

As we shall show, the being of humans in nature is grounded in inseparable unity of a complex of unique features, our objectifying activity, and its realization in production of a socio-historical world. It is fundamentally a practical reality and it is evolutionarily-anthropologically grounded in our sensory-bodily constitution as human. It is only in and through this objectifying activity that we realize ourselves, that is, through its essentially social character and in relation to the worlds we create, that our identities are formed. As we shall explain, this activity compels us to generate a self-interpretation, one that extends from ourselves to our place in reality in its totality: We are compelled to form a precognitive "view" of the world that orients us practically in this world we produce (a "view" which informs the practice of its production and reproduction). We as human always already, and necessarily, act on the basis of a determinate conception of reality and, inextricably bound up with it, a vision of the world we wish and need to create. This is no other way.

There have been different visions (as expressions of the qualitatively different forms of community that have existed throughout the course of specifically human development) and there may be competing visions (that is unavoidable and necessary in rigidly stratified and especially in class divided societies), but man is capable of achieving truth, and a truthful vision of reality achieves genuine insight into the structure and organization of nature: Not immediately given, that structure is immanent, accessible and intelligible.⁶⁷ In this regard, the issue of the place and role of man in nature and the totality is of infinite concern to us as humans.

The place and role of man in nature and in the totality and with it the question of truth and our capacity to achieve has, in turn, brought us back to the first issue discussed above, that of whether we have access to the structure of nature in its intelligibility. But this is more at stake in affirming that a comprehension of nature is significant to us, for at this specific moment in the history of capitalism it has become vitally important to us, and not just to us: Subject to the dynamics of its own development, capital is an anti-human, anti-vital and anti-natural process; it is grotesquely vampirish sucking out the vital force of all living beings. Today, its logic and movement imperils not just the state and civilization which took their

⁶⁵ „Die Ungeduld verlangt das Unmögliche, nämlich die Erreichung des Ziels ohne die Mittel. Einesteils ist die Länge dieses Wegs zu ertragen, denn jedes Moment ist notwendig,--andernteils bei jedem sich zu verweilen, denn jedes ist selbst eine individuelle ganze Gestalt, und wird nur absolut betrachtet, insofern seine Bestimmtheit als Ganzes oder Konkretes, oder das Ganze in der Eigentümlichkeit dieser Bestimmung betrachtet wird.“ From Hegel's "Vorrede" to his *Die Phänomenologie des Geistes*. Leipzig (Dürschens Buchhandlung, Jubiläumsausgabe), 1907: 20. All translations from the German are ours.

Or, again, the "elaboration of form" is by way of "distinctions [that] are definitely secured and ordered in their strict relations." But "without this last feature science is absent general intelligibility": It content "appears unelaborated rendering it something particular. Only what is perfectly determinate in form is at the same time exoteric, comprehensible, and capable of being learned and becoming the property of all." „Bewußtsein... vermißt ... die Ausbildung der Form, wodurch die Unterschiede mit Sicherheit bestimmt und in ihre festen Verhältnisse geordnet sind. Ohne diese Ausbildung entbehrt die Wissenschaft der allgemeinen Verständlichkeit... ihre unausgebreitete Erscheinung macht ihr Dasein zum Einzelnen. Erst was vollkommen bestimmt ist, ist zugleich exoterisch, begreiflich, und fähig, gelehrt und das Eigentum aller zu sein.“ *Ibid.*, 10.) Here Hegel is, of course, speaking of consciousness in the sense of *Geist*.

⁶⁶ „Das Wahre ist das Ganze. Das Ganze aber ist nur das durch seine Entwicklung sich vollendende Wesen.“ *Ibid.*, 14.

⁶⁷ Here see *The Critique of Science*, Third Study, Note; (*Dialectic of the Concrete*) which bears the subtitle *Theoretical Unity of Method, Epistemology and Ontology in the Theory of Truth*.

point of departure in the rise of agriculture some 10,000 years ago.⁶⁸ It threatens the very being and existence of the bearer of culture and Spirit, humanity, through a runaway planetary warming that would render Earth incapable of sustaining oxygen-based life for thousands of millennia. But beyond this, the future hegemony of capital potentiates a biological regression (one that would obliterate extant life forms, and would not permit the recapitulation of the development that led to hominids and *Homo*) which would carry us back to the last great warming, the onset of the Eocene some 55,000 million years ago.

The import of nature for us as it devolves on to consideration of our origins and their presuppositions in nature (that is, the unique, privileged standpoint formulated in the opening remarks to this work) permits insight into past biospheric environments of an earlier nature on the basis of which we can imaginatively grasp the extend, order and magnitude of the climate change that we confront, that is unfolding, ongoing and portends an unrivaled catastrophe (that no human being has otherwise ever witnessed), i.e., it deepens the critique of capital and practically orients us to the new Earth which is emerging from this change.

⁶⁸Today, these achievements clearly appear at best ambiguous, if not entirely deplorable.

The Origins of Man

The speculative reconstruction of man (*Homo*) at her origins and the development (hominidization) leading to modern man compel us to reach back to the organization of ancestral primate societies, which is, it might be noted, fully consistent with a position that holds man is a being in nature and not apart from it.

The position, however, lends itself to a reductionism which is hardly adequate to its object. Examining that situation will form our point of departure.

Part I

Reductionism and the Meaning of Society in the Study of Human Origins

Before we can probe and analysis human origins, we must be able to take man as an object of study and a reality *sui generis*, that is, as a novel order of being in nature without its examination being exhausted by what precedes it.

In general, the sciences of man (medicine, biology, psychology of all sorts, economics, sociology, etc.) as they have developed throughout the history of bourgeois society, take the human being as an object constructed in accordance with a model derived from modern physical science, that is, in relation to other natural objects as they appear in a scientifically reduced, because abstracted nature.

Nature, as it is in both the logical and practical senses first encountered, however, is lived and experienced as a unitary whole (diverse moments of which always stand out) whose features are sensible. This is practical, sensuous nature. *Science* is constituted, on the other hand, as the conceptual framework for the reduction of *this* (lived and experienced) nature to raw material for commodity production. The theoretical formation of modern science is, moreover, distinct from all previous culturally hegemonic knowledge formations whether archaic, statist and specifically western or otherwise: At its outset and prior to all explicit theorization and experimentation, modern science is motivated by the class-determined telos of *nature mastery*. This *telos*, atheoretical yet the comprehensive meaning and goal of scientific activity, is *embedded in its internal structure as an anticipatory projection of a mathematized nature*. Guided by this motivational teleology, the anticipation allows certain quantifying activities to form central moments of the internal conceptual organization of modern science. The projection of this telos, its requisite "practical" confirmation, and the quantitative categories taken together render modern science as such pragmatic-utilitarian, which necessarily entails a destructively technological outcome in relation to the entirety of the humanly shaped, non-humanly natural domain on which a class divided humanity rests.

Scientific thinking takes as its point of departure sensuous nature, always understood from its instances, as an aggregate totality of bodies in motion, that is, it is regarded solely in its formal bodily, and hence quantifiable, aspects. The point of departure, then, already rests on an abstraction since sensuous nature (the apperceived totality of perceptual phenomena) always presents itself an undivided whole, a unity of qualitative and quantitative, emotive and aesthetic characteristics. On the basis of this initial abstraction, the scientist proceeds to select data (phenomena) with a view to possible connections that hold between certain quantitative properties of phenomena. Selection is achieved in and through a series of formalizing and mathematizing operations. These operations are additional abstractions. They are generally products of the experiment, i.e., generated on the basis of methodologically canalized subjective capacities of the scientist. The upshot is that sensuous nature regarded quantitatively is further reduced to a series of formulae that express the "lawful regularity" of natural phenomena. Such regularity is constituted for the purposes of *prediction*. Prediction is itself guided by a concealed societally efficacious intent to manipulate, homogenize and render those phenomena raw material for commodity production on a capitalist basis. (The intent too is submerged, embedded in the conceptual structure of science. Rarely does it ever merge into the consciousness of a given scientist.

The validation of those laws demonstrates, whatever else they are, they are also *social prescriptions for the manipulation of object-like matter in the production of a world of commodities...*

The constitution of such laws is absolutely essential to rationalizing construction of a determinant socio-historical lifeworld, societies of capital... These laws are the axiomatic core of the modern science of nature, of bourgeois theory as a theory elaborated to mediate this class' relation to nature, to form the precognitive framework out which nature as raw material can form an input into the production of commodities... *In the validation of prediction, i.e., the socially generalized seeing, approval, and acclaim for its technological achievements, science and capitalism are reunited, the categorial telos of scientific activity (prediction) rejoins the original class (bourgeois), precategorical, and hidden telos of the*

domination of nature.

For the sciences of man modeled on natural science, human beings are taken as self-enclosed *objects that are external each to all, bodies essentially characterized by extension and its determinants (mass, number), and that appear in and are linked to other objects of scientifically constructed, fully causally deterministic nature*; they are allegedly made up, of various partial, vital processes and substances (e.g., blood and bone); various physiologically reducible psychological entities (emotions for which a lobe of the brain is decisive, intelligence for which a gene is said to be primary); various economic processes (reified social relations understood as things such as prices, profit, costs of production); etc., that, ultimately can be analyzed in physio-chemical terms; are said to be genetically "caused"; that can be explained in terms of reified relations (and, without justification, are in turn further reduced, explained in terms of those ultimate determinants); etc.

Yet the phenomena of daily life, beginning with the experience of one's own body, oneself, others, the built environment and as enveloping context, nature, is not primordially an experience of *objects*. The preobjective *experience* of others, and one self, through which one "lives" and suffers, is the condition of *sensible world* in the first place.

This fundamental datum is put aside, ignored or cavalierly explained away (as "illusory"). Instead, for the sciences of man, by and large the standard strategy is to posit a one-to-one correspondence between events of the "outer" world and the "internal" events of human subjectivity (thought, affection, perception, etc.), an assumption known critically as the "constancy hypothesis." The latter are said to "correspond" to the former, while the former are ontologically weighted against the latter so that the former are said to be "antecedent" to the latter and, as a rule, *causally*, at least ultimately, "conditioned" or "determined" by the former (or, again, more crudely, the former is said to ultimately be the "cause" of the latter), since the former, events, objects, and processes of the "outer" world, in their aggregated totality form a completely deterministic system in which a general causality prevails.

This, again, reproduces the model of modern physical science for which the universe is perfectly determined, i.e., wherein all events of the physical order (to which, at any rate, all events of any order are ultimately reducible), expressed mechanically, are, as such, a function of antecedent conditions, themselves perfectly determinable, situated in objective time and extended space. This position is, of course, absurd: It assumes the "perspective" of a God, that is, of an observer outside the system of events, processes, relations and things, for whom the whole system in its entirety is present, an asocial and ahistorical position which, embodied and finite and temporal, human beings (as scientists or otherwise) cannot in principle access even if such access was objectively possible in the first place. We can elaborate by instantiating a feature of the activity of early modern man (*Homo sapiens sapiens*) at her origins. (Such a discussion, moreover, has the virtue of being consistent with our presentation.) That feature, merely referenced in this discussion, is actually twofold: It concerns parietal art ("cave art") and portable art (small carved objects such as statuettes and figurines that can be carried about). These forms characterized and were, *in part*, determinant for the material culture of the Aurignacians of the Upper Paleolithic (*in part*, defining the periodization), early modern man as she first appeared about 45,000 to 47,000 years ago.

Parietal art was an autonomous form of expression of the life and activity of Upper Paleolithic hunter-gatherers. The place, role and function of this art in this life of the archaic communities was this: For nomadic hunter-gatherers, parietal art constituted a medium in and through which the animal spirit world was accessed and experienced. This experience took place beyond the normal trajectory of consciousness: It occurred in intensified states of awareness characterized by daydreaming (reveries, consciously intended fantasies), hypnagogic states (drifting off to sleep), dreaming, and fully unconscious, autonomic activity; the latter is an inward directed fantasy, induced by intense concentration, drugs or stimulants, sensory deprivation, extreme hunger, producing internally generated imagery that is other than sleep related.

Now to argue that these intensified states of awareness, or, for that matter, normal states of consciousness, are strictly determined by the neurophysiological foundations of consciousness, is not a coherent position. It is moot whether it is even consistent... in point of fact, it is not: As an object of science, the brain subsists as a moment of a fully determined causal nexus in which "making," autonomy and expression are, in terms of the science, illusions...

Let's recount this position.

Psychological phenomena can be reduced to a physical foundation that any persuasive explanation of consciousness must refer to the form and functioning of the brain, the "matter" of the mind. The ghost in

the machine is a *cognitive* illusion created by electro-chemical functioning of the brain.⁶⁹

Preliminarily, two obvious points of incoherency should be noted: First, unless cognition in all its forms and its very structure is an illusion, it should be noted that it, "cognition" (a distinctively "psychological" activity), even as in cognitive illusion, has no place in such a reductionist explanation. Second, mind, consciousness, awareness is understood metaphorically and in terms of "similes," such as *tabula rasa* on which is written information absorbed by learning, a sponge "soaking up knowledge," a "computer that has hardware," etc.

Yet all metaphors have no foundation in physical science: All these metaphors are just playing with words that have no *correspondence* in the *material world* in which the brain exists, or so the argument goes.

These are, of course, metaphors and similes that all others engaged in science, i.e., in physicalist and reductionist accounts, cannot do without. The "illusion," i.e., consciousness and speech as practical consciousness, is the only manner in and through which real foundations (the "brain") in "matter" are accessible: This fundamental reality unintelligibly, then, requires another "illusory" form and order in which what it is signified, obtains its sense, through which it "becomes aware of itself"...

Incoherency goes far beyond the inability to support assertions of the causal primacy of the brain (as well as the illusory character of mind) *on the basis of consciousness*, thereby affirming the autonomy of what is denied. Denial entails a negation of not only the independence of mind, but it's very "reality."

The basis of the analysis of human behavior carried out is conducted reductionistically, that is, with reference to some ultimate, unilinearly causal physical reality that is other and more fundamental than, underlying, human existence. Ironically, it rests on exactly the physical substance in the fully Cartesian sense that reductionisms in the hands of modern philosophical language analysis excoriates since human behaviors and social events and relations are understood as objects and processes within this physical reality. In their aggregated totality, they form a completely deterministic system in which a general causality prevails based upon the substantial reality of the "material world," the "matter of the mind," as disclosed by modern physics (in Descartes, *res extensa*, in physics generally, made up of an indivisible, discrete element, e.g., the atom or its component parts). This should be explicitly identified as a metaphysical construct...

The constancy hypothesis is absurd and must be discarded: The life-sciences and those of man deny experience, what, again, in the first place is itself the medium in and through any denial can be articulated and have meaning: Even though these sciences cannot account for meaning and consciousness on their own terms, the latter (meaning and consciousness) are necessary if these sciences are to be coherently possible at all.

Fully developed, and methodically carried out,⁷⁰ the critique of reductionism validates an explicitly philosophical inquiry into structure of human reality. The latter, in turn, establishes as a perspective the specific, if not altogether unique or *sui generis* position of man in nature. Starting from critically assessed paleontological and ethological evidence (which means beginning with the social structure of animal societies) that dialectically mediates and is mediated by this perspective, it becomes possible to speculatively reconstruct the evolutionary development of humanity.

Meaning of "Society" and Extent of Presence in Nature

To understand man in terms of her origins requires a discussion of "pre-man," that is, of hominid existence. The discussion of hominids is informed by that of australopithecines and in contradistinction to animal societies. This is not logical error, an infinite regress moving backward in geologically reconstructed time to earlier and earlier ancestors. Instead, this is an argument about what is specifically human about man as a being in nature. It is not "society."

If by "society," we mean a situation in which each individual seeks and is compelled to find satisfaction of the expanding needs, desires, and aspirations which socially and psychologically differentiate it from (define it in relation to) other individuals, while all individuals nonetheless existentially depend on the division of labor, the market and commodity exchange to achieve satisfaction; and thus, *a complete system of interdependence* is presupposed as the livelihood and happiness of all are dependent upon

⁶⁹For the assumptions and analysis that is critiqued here, see David Lewis-Williams' *The Mind in the Cave: Consciousness and the Origins of Art*. London, 2002: 105-130.

⁷⁰Such a critique is instantiated in the Appendix, below, where the relations of the brain so-called to consciousness in physiological science is examined. Above all, see Maurice Merleau-Ponty, *The Structure of Behavior*. Boston, 1982 (1942).

that of each, on each fulfilling her role in production or exchange,⁷¹ then we are speaking about an historically specific form of human sociation, capitalism, which is only thought to characterize humanity as such in the minds and phrase mongering of its crudest ideologues. If, however, we mean something like man has no "nature"; rather, he is (i.e., his being consists in) an "ensemble of social relations." If we mean that historically changing configurations of social relations (and not a genome, not instincts), which in entering into and reproducing ourselves shape our very being, if we mean *this configuration of social relations* if not society as a whole *is its fundamental structure*, then the argument is nonetheless not as clear cut as its proponents would like to think. For, in this very sense of "society" "higher" forms of animal life also are in the most decisive manner *not, not at all*, formed by, say, hereditarily transmitted structure and organization or by something like instinct. (We refer back to the outline of a phenomenology of the essential forms of life, above; specifically to those determined by instinct and those capable of practical intelligence for which individual life is beginning to be liberated from species determination.) But to grasp, know and really understand, i.e., to comprehend, this, it is necessary to grasp, know and understand man both in terms of her genesis and formation, in terms of the retrospectively constructed "line of development" that "leads" from australopithecines through hominids to humans, and to grasp, know and really understand this development both in comparison and opposition to "higher" animal forms. In particular, this can be seen in the evolutionarily formed anatomical-physiological condition for socialization in humans, namely, a lengthy period of post-natal, extrauterine development. It is this development that is synonymous with cultural (i.e., socio-historical) formation, or if you prefer with socialization understood as humanization. That anatomical-physiological development which made social-historical formation possible and necessary is the contraction of the pelvic structure that occurred (in the species, but in females in particular) with the self-making of an upright posture. But, albeit to a lesser, more limited extent, a post-natal socialization occurs in all higher primates as well as other "higher" mammalian forms (e.g., elephants and apes, where the human infant post-natally develops at half the rate of the ape infant). If some limited form of socialization takes in numerous forms of animal life, it is clearly and legitimately possible to speak of "society" in all these cases. The discussion of what is distinctively human, however, is foreclosed on if it is abstractly evolutionary, that is, if it remains strictly a discussion of anatomical-physiological conditions for the emergence of man. Yet this is precisely the operative assumption of all analysis that is scientific.

Let's consider this in some detail.

From the late 19th century onward, paleontologists have rested their reconstructions of the origins of man on fossil analyses. The best analyses were morphologically based efforts to reconstruct organ structure and function. But large swaths of the geological past provide little in the way of adequate fossil evidence. In the case of man, cranial capacity (indicating brain size) and differentiations based on various features of dentition weighed heavily on phylogenies that were constructed. Crick's and Watson's and (Rosalind) Franklin's discovery of DNA, together with the invention of the electron microscope a decade later, established the ground for a new entry into the study and analysis of human origins. These were the molecular biologists.

Paleontologists and molecularists have this much in common: They reject the widely held 19th century view that *Pongo* (orangutans), *Pan* (chimpanzees) and *Gorilla* belong to the same taxonomic group, and perhaps that *Homo*, related to Africa apes, may be closer to *Pan* than to *Gorilla*.⁷²

After years of warring in which anatomical analysis yielded dates from 5 to 10 million years ago (Ma) and as great as 16 Ma while the geneticists, greatly heartened by the discovery of "Lucy" (*Australopithecus afarensis*) at 3 Ma, provided dates from 2.5 to 4 Ma based on the "molecular clock", what appears as an unprincipled agreement was reached in 1982 to regard the moment of the divergence of ancient (Miocene) apes from the "line" that leads to man (from hominids) at 7 Ma. Beyond this, they agree on little if anything.

⁷¹"Die konkrete Person, welche sich als besondere Zweck ist, von Naturnotwendigkeit und Willkür, ist das eine Prinzip der bürgerlichen Gesellschaft, - aber die besondere Person als wesentlich in Beziehung auf andere solche Besonderheit, so daß jede durch die andere und zugleich schlechthin nur als durch die Form der Allgemeinheit, das andere Prinzip, vermittelt sich geltend macht und gefriedigt." G.W.F. Hegel, *Grundlinien der Philosophie des Rechts*. Philosophische Bibliothek, Band 124. Leipzig 1911 (1821): §182.

⁷²Though much of this has recently changed too. Many geneticists now think that based on genomic studies, the genus *Homo* should include chimpanzees and gorillas. And there are other variations. See Mark Collard and Bernard Wood, "Defining the Genus *Homo*" in Winfried Henke and Ian Tattersall (eds.), *Handbook of Paleanthropology. Vol. III, Phylogeny of Hominids*. Heidelberg, 2007: 1575-1611, esp. 1586-1587.

Briefly, consider the geneticists.⁷³

A molecular clock is based on the premise that the rate of molecular change of a given protein (an amino acid sequence) or DNA (a nucleotide sequence) is roughly the same over time and, evolutionarily speaking, roughly the same for different lineages. Molecular dating is alleged to provide detailed temporal frameworks for divergence events, i.e., speciation, in phylogenetic trees (what we characterize as the last common ancestor of divergent "lines" of development). But examination of the rates of DNA change of different phylogenetic groups shows different rates. The slowest observed is in man, then higher primates (where during evolution it has markedly decreased) and some bird phylogenies, while rates in rodents are faster, and even faster in the fruit fly, *Drosophila*. The differences were at first thought the consequence of evolutionary mutations, and biochemical activity such as DNA replication. Among mammals, they are now largely considered a function of body size, generational turnover, fecundity and lifespans (as a rule the smaller, the quicker, the higher and the shorter respectively, the faster the rate of evolutionary change). There may be other determinants also, behavior (e.g., mating) and ecology (e.g., range restriction or isolation), for example.⁷⁴ Many of the most important rates of evolutionary change (e.g., between *Pan* and *Homo*) give dates for divergence events that are paleontologically refutable. But the science of genetics, at any rate a theory prescribing and devolving onto capitalist technologies of social control, is burdened by other strictly theoretical problems: First, the point of departure of any phylogeny is arbitrary. For example, if we wish to determine that moment at which Old World as Old World monkeys first speciated, or any later speciation event, we must provide an encompassing geological-temporal framework – which is determined from the divergence of Old and New World Monkeys set at, say, 30 million years ago. This initial framework calibrates the molecular clock. But what are we to make of the initial point of divergence?⁷⁵ If it is wrong? Second, a phylogenetic point of departure forgoes evolutionary comprehension because ape-like features are exclusively defined on the basis of modern animal forms (i.e., the chimpanzee) and not those of Miocene hominids which are the ancestors to hominids and which in the structural and functional organic sense are significantly different. (As an analog to the analysis of historical forms, taken straightforwardly Marx's claim that human anatomy is the key to that of the ape is simply wrongheaded.) So that, for instance, unrecognized by biomolecular analysis the derivation of locomotion in chimpanzees and humans is different. Yet genetic study tells us that the two beings share 98.4% of their respective genomes. In comparisons, modern features are effectively projected backward into geological time and form the model for the comparison.

Correspondingly, contemporary eastern Africa environments (dry savannah) are assumed to provide the context in which hominids first appeared. (They are not. Those environments were wetter, and interspersed with woodlands and forests; the air too was more humid).

Paleontologists too are not free of problems and impasses, whether recognized or not.

The most recent finds that date from 1994, 2001 and 2006, *Ardipithecus ramidus*, *Orrorin turgenensis* and *Sahelanthropus tchadensis* have pushed back hominid origins to 4.5, 6 and 7 Ma respectively. Their analyses demonstrate a sensitivity to a presumed earlier Miocene ape heritage while anatomically diverging from these forms – especially with regard to dentition, and the structure of the foot and the femur (in *Orrorin* the cortical bone of the femura neck is very much similar to later hominids). But all this poses a problem: A number of significant anatomical features in Miocene apes are evolutionarily convergent making it difficult to reconstruct their relations to one another (and thus to compare them with species who evolutionarily appear later) or parallel so that they possess analogous structures that serve different functions i.e., the same organic traits have been acquired and appear in unrelated lineages (e.g., bats have wings and primates, and humans, forearms that serve altogether different purposes but if pursued far enough back all have a common ancestral state.) Yet there is, for example, evidence for

⁷³Palaeontologically, criticism of the geneticists (molecularists) is nicely laid out by Brigitte Senut, "The Earliest Putative Hominids" in *Ibid*, Vol. III, 1519-1538.

⁷⁴R.J. Britton, "Rates of DNA Sequence Evolution Differ between Taxonomic Groups" *Science* 21 (March 1986). Vol. 231 no. 4744: 1393-1398; Arnason et al (2000), "Molecular Estimates of Primate Divergences as Estimated by Two Nonprimate Calibration Points." *Journal of Molecular Evolution*, 47(6), December 1998: 718-727; Lindell Bromell, "The Genome as a Life-History Character: Why Rate of Molecular Evolution Varies between Mammal Species." *Philosophical Transactions of the Royal Society B*, 12 September 2011: 2503-2513.

⁷⁵Takayoshi Kano, *The Last Ape: Pygmy Chimpanzee Behavior and Ecology*. Stanford (CA), 1992: 10.

For further analysis and criticism of the molecular clock, and the metaphysics required to support molecular phylogenetics, see *The Critique of Science*, Fourth Study, Not₄₂ (*Molecular Phylogenetics and the Full Reductionist Program*), below.

craniodental parallelism among Miocene apes.⁷⁶ In *Ororin* the analysis relies heavily on a comparison and contrast with Miocene apes. At the same time, evidence is thin: Analyses of the *Ardipithecus* pelvic and the *Sahelanthropus* cranium are based on virtual reconstruction (largely because with *Sahelanthropus* there are no postcranial remains, no skeletal features below the skull) that are loaded with assumptions (in the case of the pelvis involving a simple linear extrapolation of dimension from a morphologically similar species) that, taken in isolation, may generate unjustified conclusions⁷⁷ and thus the lack of a foot, leg or pelvis limits claims to bipedalism.

Even on their own terms in these contemporarily leading, counterposed (genetic and paleontological) accounts there is no coherent perspective that would incorporate features that relate the difference between specialized (derived) and unspecialized (primitive) organs to overall anatomy. There is nothing other than what we call natural determination and natural determinism. Does a species grouping control its own demographical density, and does this limit or abrogate environmental determinism? Do behaviors and activities of species groupings over generations effect their anatomies, even their so-called genetic basis? These accounts offer, and are in principle incapable of offering, nothing in this regard (denying their very possibility). We shall suggest something different.

Part II

From Animal Societies to Man at her Origins

The study of human origins cannot proceed without reference to that which preceded it. Here we shall attempt to develop an understanding as to what preceded them as well as those origins themselves in their specificity and distinctiveness.

Historical Conditions of Superior Insight into Society and Nature and the Problematic Relevance of Animal Society Studies for that of Human Origins

As we shall have occasion to discuss further, society reaches back into nature and nature forward into society. For now, we shall simply state that it is not just possible, but in the analysis of forms of animal existence it is necessary to speak about animal society. Begin, then, with the social structure of animal societies.

There is a broadly based tradition within the study of animal behavior for which nature and society are not understood in terms of opposition, even if the latter took shape in an evolutionary development that led from the former to the latter, for instance the case of man.

The literature here is extensive, and it is important to understand why here we shall only refer to a few of the more significant older texts:⁷⁸ Research so-called did not begin in this "field" until after the last imperialist world war, and it did so only with the diverse methods of (since it was conducted by) zoologists and ethologists, anthropologists and psychologists. The study of animal behavior came into its own in the late 1950s and reached it highpoint in the latter sixties.⁷⁹ (We shall begin largely with this literature.) Defined by the possibility of rapid, large-scale social change, it is periods like this one wherein knowledge and understanding of ourselves and our place in nature qualitatively develop: In the sixties into the seventies a working class movement against capital (aimed at suppressing work) appeared as a challenge to capitalist society. Albeit tacit, workers' challenge was total. Because it was, it generated the cognitive "space" in which it was possible to seek the historical specificity and limitations of existing society, to see in front of it and beyond it in the qualitative historical sense. Like almost all other endeavors and studies funded by public monies (and private monies for that matter also), i.e., funded by the state (capital's state), the study of animal behavior has since that time been increasingly subject to immediate and direct determination by the requirements of reproduction of the capitalist social order, especially, by the demand for behavioral control of human populations on the model of simple animal groupings (a reductionism that is wholly consistent with a scientific study of "man"). Thus, perhaps the most significant analyses and insight into animal behavior are to be found in this literature, specifically

⁷⁶Bernard Wood and Terry Harrison, "The Evolutionary Context of the First Hominins," *Nature* 470 (11 February 2011): 347-352.

⁷⁷John Hawks, "The *Ardipithecus* Pelvis," accessed at <http://johnhawks.net/weblog/fossils/ardipithecus/ardipithecus-pelvis-2009.html>.

⁷⁸Michael Chance and Clifford Jolly, *Social Groups of Monkeys, Apes and Men* (London, 1970); J.H. Crook (ed.), *Social Behavior in Birds and Mammals* (New York, 1970); K.R.L. Hall, numerous articles in Iven De Vore (ed.): *Primate Behavior: Field Studies of Monkeys and Apes* (New York, 1965) and Phyllis C. Jay (ed.), *Primates: Studies in Adaptation and Variability* (New York, 1968).

⁷⁹Chance and Jolly, *Ibid*, 14.

with a view to monkeys, chimpanzees, apes and baboons, in a word, primates. This is the perspective which we shall take as our point of departure, though not uncritically as we'll see. Thus, we are assuming and not without warrant that, in point of fact, study of the structure of contemporary primate groups can tell us something about the hominid origins of anatomically modern man. (*Homo sapiens sapiens*, hereafter simply "man, and "human" in adjectival form). This is not as straightforward as it might seem. It is also problematic.

The division is not simply given as an evolutionary carryover reproduced in each new species, i.e., anthropoids becoming man, for three reasons.

First, the whole sense of our argument is that in nature at this level of complexity and development, whether hereditary or produced as responses to a uniformly similar environment, simple carryover can no longer be found. Heredity is not the "mechanism" through which society is reproduced, and over geologically reconstructed time there are no uniform environments on Earth (i.e., the Earth itself constantly undergoes change in geophysiological processes that modify it, its atmosphere, its landmasses and oceans, and it undergoes that change with the tempo and pace of transformative processes such as volcanism and plate tectonism). The Earth that existed 7,000-10,000 years ago is not the Earth that exist 70,000-100,000 years ago, and certainly not the Earth that existed 7-10 million years ago.

Second, while it is an explicitly operative assumption in the study of Earth as well as those of microbiotic life forms that the essential features of processes, relations and events as they appear today are no different than they were at any earlier moment in Earth history, this is not the same as stating that archaic primate societies are structurally no different than contemporary animal societies.

Third, beginning with the anthropoids (specifically, the great apes), for example, as Engels did, a uniform line of development from ape to man cannot be evidentially reconstructed. Hominini (chimpanzees and bonobo and their extinct lineages, and, yet to appear, *Homo*) speciated from the ancestors of today's gorillas about 10 million years ago. Even if, very loosely speaking, it possible to talk about a "line of development" with its numerous offshoots and dead-ends consisting in australopithecines, other hominids and humans, this is not a linear sequence. The hominids did not spring from the great apes; they are two separate developments with a common, unknown ancestor.⁸⁰

The evidence for distinct developments is anatomical and morphological: The skull (jaw, chin, brow ridges), dentition, hands, and feet of archaic anthropoids (ponjids, i.e., chimpanzees, orangutans, and gorillas, at the point at which they supposedly gave rise to hominids) indicate highly specialized development. The same paleontological evidence, on the other hand, suggests that early hominids, like humans, possessed similar, though unspecialized organs. For hominid development to have sprung from the anthropoids, it would have been necessary for, say, the great apes to have lost these specialized functions (for example, the huge jaw that brings together olfactory, audible and tasting activities), and then at some point in later evolution regained the same organs with their specialized functions as witnessed by modern anthropoids. Contemporary archaeological evidence suggests that argument from unspecialized anatomy, muscular and skeletal functions is sound: Having occurred, once they disappear evolutionary developments do not reappear.⁸¹ The same evidence, in fact, supports the logico-evidentiary argument for a separate human development.⁸²

⁸⁰Most recently see, for example, Jamie Shreeve, "The Evolutionary Road," *National Geographic*, July 2010 (V. 218, no. 1), 35-67: 45, 59.

⁸¹This is an old debate in the philosophical and theoretical discussions of human origins. See Arnold Gehlen, *Der Mensch. Seine Natur und seine Stellung in der Welt*, 1940 (English translation, *Man: His Nature and Place in the World*, 1976), who, before contemporary evidence resolved the issue in his favor, most forcefully articulates the position for a separate "line" of human development in opposition to the materialism represented by, e.g., an Engels.

The argument did not end with Gehlen. Steve Gould authored a critique of the limits of European paleontology (Stephen Jay Gould, *Ontogeny and Phylogeny*. Cambridge (MA), 1977). Gould shows that European paleobiology (paleontology), largely that of the late nineteenth and early twentieth centuries, draws certain conclusions concerning the irreversibility of evolutionary development based on morphological analysis. (Here, see also Gould, "Dollo on Dollo's Law. Irreversibility and the Status of Evolutionary Laws," *Journal of the History of Biology*, 3 (1970): 189-212.) Gould's analysis suggests that irreversibility (most crudely, ontogeny follows phylogeny, starting embryonically the species-individual recapitulates in its total development the stages, compressed, of the ancestral line, hence the designation "recapitulation") is not tenable, that, even in a Darwinian framework, there are developments that can be retarded or accelerated, leading to the juvenilization of the adult form, thus, within a lineage the appearance of earlier forms at a late moment in that lineage's evolution. This is an elaboration, more sophisticated more paleontologically oriented, of a position not dissimilar to Gehlen's.

For Gehlen, *Ibid*, 93-116, esp.113; and for Gould in this respect, *Ontogeny and Phylogeny*, 356-404, esp. 356-362.

⁸²For example, in writing about the work of a team headed by paleoanthropologist Tim White around *Ardipithecus ramidus*

Even if we make the large assumption that the *social organization and structure* of primates has been stable for thousands of millennia, the study of primate behavior does not yield up a determination for a line of development that separated from the ancestry of primate animality somewhere between 7-10 million years ago. Nonetheless, social division based on hierarchy and relations of command and obedience is present in contemporary primate social groupings and in the late *Homo* species (archaic *Homo sapiens* and Neanderthals), and it is present with humans (anatomically, i.e., inadequately, speaking, *Homo sapiens sapiens*) at our origins. On evolutionary assumptions, no alternative reconstruction other than that which we propose here can remotely explain the determinant presence of hierarchy in human communities at the terminus of the last glacial sixteen thousand years ago.⁸³ ... Yet, together with its historical foundations, this analysis does not just raise questions of internal coherency. It is, and they are, politically problematic to boot: *If the perspective on a historical opening created by workers' challenge to capital is adequate as a basis for understanding the moment of the appearance of the efficacy of this tradition, it also suggests the workers' movement was terribly inadequate to realizing its own desires (suppression of work): It remained (and remains) far, far too integrated into the movement of capital, too captive to its logic. For what the cognitive space it opened up offers is a reconstruction of the origins of man, Homo, by way of the movement from the animal society studies to human society articulated in terms of the categories of domination: Hunting produced the bipedalism that first defined hominids (hominidization), then man. Tool making produced a material culture. On these grounds speech, language and ideation followed and eventually, work, production and an economy were all formed. These are the categories of domination, that is, of man as being that emerges from nature by counterposing herself to it, by mastering and overcoming it and herself as nature*

in the Middle Wash region of Ethiopia, Jamie Shreeve states, "It had long been assumed that the further one probed into the human evolutionary past, the more our ancestors would look like our closest living relatives, the chimpanzees. At 4.4 million years, *Ardi* was over a million years older than the famous Lucy skeleton... *Ar. ramidus* didn't look like Lucy – but she didn't look like a chimpanzee either. Instead, she possessed a weird combination of very primitive traits seen before only in monkeys and extinct apes from the Miocene epoch and traits seen only in our own hominid lineage." ("The Evolutionary Road," 63); and, more explicitly, "Combined with the other very primitive [i.e., unspecialized] traits in *Ar. ramidus*, this monkey-like hand holds enormous repercussions for understanding our origins. If *Ardi*'s discoverers are right, *our ancestors never passed through a chimp-like, knuckle-walking phase on their way to walking upright. To argue that they did so would require that very early in one lineage we developed a chimp-like tool kit of adaptations – and lost them all again and reverted to the primitive condition* by the time *Ar. ramidus* was walking about. This is highly unlikely" ("Ibid," 66, emphasis added). Less clearly, but making the same point concerning unspecialized development with reference to *Australopithecus afarensis* is the following: "Perhaps the most surprising aspect of Selam's anatomy is that her shoulder blades are shaped more like a [very ancient, extinct] gorillas than a chimpanzee's or a human's. Lucy's shoulder blades were missing, so this is the first chance scientists have had to study complete *afarensis* shoulders. The "problem [with] the gorillas shape is the kind of all-purpose primitive [unspecialized shoulder blade] that the common ancestor of chimps, gorillas, and humans all had, and it is retained in *Australopiths*." Zach Zorich, "The New Face of Evolution," *Archaeology*, January/February 2007 (V. 60, no. 1): 27-29: 28, citing paleontologist Fred Spoor, a member of the Zeresenay Alemseged team also in the Ethiopian Awash River region.

⁸³Similarly, Moscovici offers a caveat concerning utilization of the analysis of contemporary primate societies: « ...primates sont à la fois les proches parents de l'homme et aux antipodes de lui. Leurs conditions de vie présentes diffèrent notablement de celles qui prévalaient à l'époque où les hominiens se sont formés en tant que genre biologique indépendant. En effet, ces diverses familles de simiens ne sont pas nos ancêtres : elles résultent d'une évolution entièrement différente et qui prend son point de départ dans d'autres espèces. N'oublions pas, par ailleurs, que les observations faites sur les sociétés de primates les appréhendent dans un milieu qui, outre ses écarts climatiques et géomorphologiques par rapport à cette période reculée, est marqué par la présence de l'homme. Pour ne pas insister sur la découverte des variations intraspécifiques de leur organisation sociale, qui suppose que la saisie de celle-ci en des points particuliers de l'espace et du temps devrait tempérer toute généralisation prétendant retrouver l'organisation sociale d'une espèce tout entière partout et toujours. Force nous est de nous appuyer sur une hypothèse d'universalité et de nous référer aux observations sur les primates actuels à titre d'analogie. Elles sont le support d'un modèle possible de notre passé, et non pas un témoignage sur celui-ci. » ("...primates are both close relatives to man and opposed to him. Their present living conditions differ significantly from those prevailing at the time when hominids appeared as independent biological genera. Indeed, these various families are not our simian ancestors: They arise from an entirely different evolution, which takes its point of departure in other species. We should not forget, moreover, that observations of primate societies are made in a milieu which, in addition to its geomorphological and climatic differences from this early period, is marked by the presence of man. For, not insisting on the discovery of intraspecific variation in social organization means that seizing on that past at a particular moment in space and time should temper any generalization that pretends to reconstruct the social organization of an entire species at all times and places. We are forced to rely on an assumption of universality and to refer to observations on living primates by way of analogy. These observations support a possible model for our past, they are not a witness to it." Our translation.) Serge Moscovici, *La Société contra nature*. Paris, 1972: 413.

remaking herself, creating a built environment and a collection of techniques that mediate this mastery, thus creating second nature (society forming human beings). It is the perspective of human socialization as civilization set down in nature as an army of occupation, in the end that of science and capital albeit greatly refined.

Studying the structure of contemporary primate groups is, then, a minefield: It may tell us something about the hominid origins of man; and what it tells us may be misleading. We shall simply have to work through the analysis of animal society and see where it takes us. Anticipatorily, the perspective and conclusions it gives rise to will suggest and point to a different center of analysis.

Animal Societies (Primates) Monkeys and Baboons

Primates around the world are concentrated in the tropics, from roughly 25° N to 20° S latitude of the equator. Within this zone, they can be found in a variety of ecologies ranging from savannahs, to woodlands and tropical forests, to lowland and mountainous forests.

With variations, three primary groups constitute primate societies and form their basic structure: Adult males, females with and without nursing young, and juvenile males.⁸⁴ Within these groups major forms of activity include grooming, play, foraging, nursing and sexual behavior.

Primate groups, certain types of baboons, rhesus monkeys and langurs for instance, are organized around a leading male or leading males, thus into "clans," depending on size of the "troop." Group size can range from 11 to 200 individuals, yet a far more common range is 15-80 with a norm of 25-50.⁸⁵

Thus, there may be up to three "rings" of leading males in a large troop depending on the species.⁸⁶ Females of reproductive age or potential cluster around leading males. In some species, females with the young they nurse gravitate to the leading males and form an inner social space around them; in others, nursing females and their young form separate clusters.⁸⁷ Around any of the core groups other females with their pre-adolescent young will be found. On the periphery, non-reproductive juvenile males are situated. There are, of course, exceptions to this structure, especially among gorillas and chimpanzees as we shall see.

Females With and Without Nursing Young. It is in the spaces where the infants are cared for by mothers that socialization initially takes place during the period of infancy (ranging, again with exceptions, in these groups from roughly 4 to 20 months in the most instances).⁸⁸

What occurs here can only be understood dialectically in terms of the mutual mediation of physiological maturation and socialization: Starting from sucking at the nipple the infant comes to recognize its mother, then other females and other young, eventually dominant males and the group as a whole, but all of this transpires within the matrix of socializing relations, i.e., being groomed and learning to groom, playing with other young peers, playing with older females, following the mother and learning to forage, and it occurs as the infant's musculature develops (for instance, in many cases in as few as ten days of life the infant is increasingly able to subordinate plantar reflexes that control the hind legs to animal sentiment of the self, i.e., to control of a sensory-motor awareness).⁸⁹ Social interaction accelerates sensory and motor skill development, while physiological maturation expands the ranges of social activities. The same mutual mediation in and through which humans are socially formed (humanized) appears among

⁸⁴Chance and Jolly, *Social Groups of Monkeys, Apes and Men*, 157.

⁸⁵K.R.L. Hall, "Social Organization of Old-World Monkeys and Apes in Phyllis Jay (ed.), *Primates*, 7-31. See the chart, 16.

Gorilla groups are proportionally smaller ranging from 11-20, on average about 15. George B. Schaller, "The Behavior of the Mountain Gorilla" in Iven De Vore (ed.), *Primate Behavior*, 335-336.

⁸⁶Chance and Jolly, *Ibid.*, 126. Reference is to Japanese macaque societies.

⁸⁷Chance and Jolly, *Ibid.*, 114-120.

⁸⁸*Ibid.*

Among gorillas, even though nursing has stopped after 7-8 months infancy is more prolonged, lasting about 3 years. Schaller, "Ibid." 350, 332, 333.

The period of infancy is not species specific. Instead, it is largely a function of status within the animal community. Infants of females with greater status (those who have mated with a dominant male) are accorded more attention (grooming by other females, attention from leading males), are most stable, less needy (i.e., require less attention as maturation occurs) and integrated into juvenile groups at an earlier age. This is especially true of most subspecies of baboons. Chance and Jolly, *Ibid.*, 123-125. This much said, among langurs there is more equality if you will, since all mothers and females tend to place the infant as the center of attention. *Ibid.*, 117. Here we are speaking, we stress, of primate societies structured along the lines of a rank hierarchy.

⁸⁹*Ibid.*, 115-116, 126 note.

For animal sentiment of self, see Part V, "The Constitution of Spirit within Nature," below.

primates. This is genuine socialization: There is no physiological development that can be otherwise decontextualized: An infant that is isolated from its mother (who has died, perhaps been killed) and that is not immediately taken under the wing and cared for by another female, other females, or even dominant males in some species (and in the presence of the group this care will always be extended) will not revert to some "survival instincts": It will instead go into a state of depression, its learned (e.g., exploratory) behaviors will disappear, it will not eat, it will die. Even the instincts in animals which the dominant social Darwinian tendency in bourgeois culture maintains are "natural," "fundamental" and will always in extreme situations assert themselves are, in fact, entirely reliant for their development and assertion on socialization processes.

So, in these spaces, socialization unfolds: Behaviors that include not just actions but postures, gestures and vocalizations are learned and transmitted from one generation to the next while varying both situationally and according to age, gender and standing ("rank") within the group. Most importantly, lasting social bonds are formed that are the basis of group cohesion and that can easily be seen in the relation of the gorilla,⁹⁰ mother and child and the comfort she provides it. Of equal importance, these behaviors involve relations of domination and subordination (deference), emphasis on the latter (such as submissive postures). These rise on the basis of tactile affection: In most primate species, touching and holding are important, as in humans. Deference in particular is learned, for example, in grooming, licking, in forms of eye contact (between mother and infant, often as a short distance the one from the other), in presentation in front of a dominant male; and, it is assimilated and internalized as in the behavior of the mother as she constantly checks the locale and posture of the dominant male(s)⁹¹ (whose orientation here is defensive and protective, on the lookout for predators or other dangers in the milieu). Among the dominant males, lip smacking is practiced in the proximity of the infants as a signal of assurance that no harm will come to the young from them. Of final significance, none of these behaviors and dialectically the socialization practices in which they form and out of which they rise are dependent upon the specific features or characteristics of the ecological regions the group occupies. (I.e., they are not somehow "environmentally determined.") In this respect, it should be noted that grooming is not merely a matter of cleaning, or an affirmation of deference, but amongst those species that are structured by rank and hierarchy and those that are not, grooming affirms and deepens social bonds.⁹²

Less rigid than the adult male coterie, the female groups are generally more softly hierarchical also.⁹³ *Juvenile Males.* At a month to three months, the infant will trail along following the mother learning about her food and eating habits.⁹⁴

By four to eight months, the infant's day is no longer structured by time spent with adults, the mother in particular. A number of hours each day are consumed in play with companions of the same age coterie. (Among gorillas exclusively it seems, play, similar in form, is restricted to infants in the first three years of their lives.) These groups can range from small (2-4) to large (upwards 16). Play includes running, jumping, climbing and somersaulting, chases, tail-pulling and tickling, mock fighting and wrestling among more elementary forms, and more sophisticated forms that involve the surrounding environment and objects in it, sliding down hills and, generally, exploiting the possibilities of the lay of the land, of tree limbs and branches. In revealing behavioral limits, play as social also socializes. It, of course, also develops sensory-kinesthetic coordination, and one sense of the animal milieu for play is always exploratory.

Depending upon the species, the interests of the mother in the young begins to wane after 15 months to two years. Simultaneously, the period of anoestrus ends as she no longer lactates (it effectively marks that moment at which the young become juveniles),⁹⁵ the sexual cycle returns to the mothering female and the infant passes into its youthful adolescence. (In cases where the youth refuses to let go, the mother engages in escalating behaviors that over time drive the child away, that is, into its "proper" grouping within the community.) At the same time, a physiological differentiation between males and

⁹⁰As a reflection on Schaller, "Ibid," 351, will suggest.

⁹¹Chance and Jolly, *Ibid*, 174.

The authors claim that it is attention directed to the dominant male which sustains the cohesiveness of the group, not rank order as such. Moreover, dominance (high status) is not always a product of aggressiveness. *Ibid*, 174-175. Maybe. Nonetheless the behaviors appear inseparable and difficult to neatly distinguish.

⁹²E.g., K.R.L. Hall and Irven De Vore, "Baboon Social Behavior" in De Vore (ed.), *Primate Behavior*, 106.

⁹³Chance and Jolly, *Ibid*, 158.

⁹⁴*Ibid*, 116-118, 135, 157, 158; Hall and De Vore, "Ibid," 83, 84, 87; Schaller, "Ibid," 339; Jane Goodall, "Chimpanzees of the Gombe Stream Reserve in De Vore (ed.), *Primate Behavior*, 460.

⁹⁵Chance and Jolly, *Ibid*, 120, 129; Hall and De Vore, "Ibid," 84, 85

female youths begins to take place as the male grow to greater size. During this period, the juvenile male undergoes extensive skeletal and musculature growth (in baboons, the canines fully erupt), though remaining smaller than fully adult males.

The differentiation is simultaneously social: Female and male juvenile play is largely restricted by gender with the juvenile males forming a separate distinct coterie while the juvenile females are assimilated into the female groups engaged with the infants and very young.

Among some species, especially chimpanzees, juveniles play with older infants. The relations are significant here, for there is no roughhousing, such as among humans the predatory and competitive behaviors of the larger aimed at the smaller and younger as we so often find among children in bourgeois societies. We shall return to this, suggesting why it is the case.

The juvenile male groups spent most of their time in foraging and play (jumping and vaulting over and with sticks and branches, wrestling, climbing).⁹⁶ Deference become more defining (the group is more rigid than the female coterie, more flexible than the adult males), but, of import for us, juvenile males are belligerent and combative. As a structural group in primate societies, they have greater social mobility and in the spatial sense occupy the outer region of the community.

It is in these groups that the juvenile males begin to exhibit the behaviors that will determine their position with the societal hierarchy.

Dominant Male or Male Cohort. Dominance is achieved behaviorally: What counts is superior strength, active threats, aggressive demands for submission, which in these societies we believe might be captured in a single word, prowess which, of course, for a young adult must be continually proven and renewed.

Numerically, dominant males as a group are smaller relative to other groups. Usually numbering no more than seven, various degrees of group coherency are structured by rank, hierarchically.⁹⁷ In societies that are more than loosely connected bands headed by a single adult male (gorillas are the most predominately one male nexus), relations among dominant males are agonistic, and tension is relieved and coherency maintained by deferential behavior along the lines of the hierarchy. But even one adult male group can form "unstable associations," e.g., *hamadryas* baboons will gather under cliffs to sleep in large groups numbering from 12 to 750 and disperse and move off to forage and feed during the day. (Moreover, different groups may reassemble at night.)

While females and juveniles are peripherally attuned to the adult males (glancing at them to situate them in the local milieu) while attending to the young, thus their attention is largely to internal affairs of the group, the adult males are "outward" looking, their attention is predominantly oriented to the larger environment for dangers, especially predators.⁹⁸ Watching is the decisive element: These males vigilantly look out for, locate and situate potential (predatory) danger. In the cases of the single adult male groupings, these males intimidate, threaten and, when necessary, attack the predator or, alternately, divert it, and the danger it incarnates, away from the group which in turn seeks concealment and shelter, say in long grass (behavior typical, for example, among patas).⁹⁹ This forcibly speaks to the socially specific behaviors, to social and not natural-biological determinism.

The lead male also is dominant (and this bears rather heavily on the discussion of aggressivity, its determination, below) as exhibited in behavior that, (i) prevents serious fighting within the group, (ii) protects females and their young from harm from other group members, (iii) assumes the lead in alertness and watching for danger (especially predators) or actually goes forward to threaten or attack a predator or an animal perceived as a danger to the group, (iv) chases off or threatens a member of another, same species group, (v) takes initiative in directing the group, foraging, moving about an existing or new region,¹⁰⁰ and (vi) mates exclusively with some, if not all females as they reach an estrous height.¹⁰¹

⁹⁶Chance and Jolly, *Ibid*, 176-177, 179, 159; Hall and De Vore, "Ibid."

⁹⁷Chance and Jolly, *Ibid*, 179; Hall, "Social Organization of Old-World Monkeys and Apes," 18.

⁹⁸Chance and Jolly, *Ibid*, 172, 182.

⁹⁹Hall, "Ibid," 20-21; Hall, "Aggression in Monkey and Ape Societies" in Jay (ed.), *Primates*, 158, 157, where it is noted that in a group of patas a lead male, staying out in the savannah at night in order to watch, may climb a large tree as much as 400 yards out from the next individual of the group.

¹⁰⁰Hall, "Social Organization of Old-World Monkeys and Apes," 22-23; Hall and De Vore, "Ibid," 56.

Baboon males have been often observed to drop back behind a moving troop to walk with a mother with nursing young who was having difficulty staying with the group. "Ibid," 86.

¹⁰¹Lasting a few months, most groups of primates have discrete periods in which birthing occurs. The exception here is the gorilla and chimpanzee or at least the free living and free ranging gorilla and chimpanzee. Hall, "Ibid," 15; Hall and De Vore, "Baboon Social Behavior," 71.

In some primate animal societies, dominance is facilitated by size, by a pronounced sexual dimorphism such as in apes, rhesus monkeys and baboons, where (in the last) the male is twice the size of the female, accordingly about that much heavier, and has larger, well developed canines.

Dominance in large groups may not fall to one individual. Instead, there may be a couple or more males who assert dominance in different kinds of situations, forming sort of an "alliance." Alliances can form as two lead, yet subordinate males act in concert against the dominant male, or, again, there may be no clear cut single dominant male but only an alliance in which dominance is asserted in relation to the rest of the troop while there is mutual tolerance; say in eating. Alliances shift: They are dynamic (not linear, i.e., the best fighting male may not always be the dominant one unless he is the sole adult male in a troop, and) not in the sense of different "issues" that provoke realignments, but rather as over time young males successfully assert themselves (especially in access to food or estrous females) and the old or very old males fail to do so. It may be that it is a young adult male whose mother is closely connected to the dominant males, herself high in the female hierarchy, that challenges the lead male.¹⁰²

Whatever is visible and ideologically promulgated in the spectacle, actual fighting is rare in nature, and, against Darwinism for which it figures as the potential outcome of survival and reproductive "strategies," it is unimportant. This, moreover, is an immediate consequence of the fact (observed most easily in the gorilla) that primates do not "possess" and thus have no need to defend fixed territories, but instead move in ranges that overlap.¹⁰³

Dominance is nuanced, but it is real. For example, after rest or a nap, the lead gorilla will rise and stand motionless on his hind legs (more or less bipedally), and the troop will immediately rise and prepare to leave usually to resume foraging. No gesturing or vocalization is necessary. Or, again, in a moving troop of baboons the dominant males will not be the lead males. (The latter will be young adult males.) The dominant males will be found in the center of the troop with a female and a passel of young around each of them, juvenile males to the sides. But if the troop changes directions, taking their cues from elsewhere, the lead males will have already have done so: Steering of the troop comes from the center, from the dominant males. Take another instance. Among females, dominance is rarely asserted forcibly, more by "attenuated" gestures; moreover, in some species adult females will assert themselves over younger males. And, as a rule it is not all that frequently asserted (e.g., especially among chimpanzee and patas).¹⁰⁴

Outside the group structure and within a region or habitat often frequented or "native" to an animal group, other same (subgroups so-called) or different species may also live. If predators are not present, they appear to coexist remarkably well suggesting social "flexibility" among primate species. This flexibility extends to the size of the group which will vary depending on what the resources of a region offer.

Aggressivity is as a rule not significant here, as the mutual presence of one group to another (same species) is regularized without conflict.¹⁰⁵

Aggression. For the most part, aggression is uncommon. It concerns behavior directed largely toward members of the same group or toward other groups of the same species. Of course, primates, say a baboon, will attempt to drive off or even attack another species individual, say a leopard, that is stalking one of the young in the group.¹⁰⁶

There are several issues here. The first concerns tool usage,¹⁰⁷ and the general framework for

Among gorillas in the wild, contact is only significant in the mother-infant relation. (Recall infancy is extensive in gorilla bands). Grooming too plays a far smaller role in socialization rarely being witnessed in adults, as it does in chimpanzees (see above). Even sexual activity is vastly limited (say relative to baboon species), which may have much to do with estrous cycle in female gorillas which are very similar to those among humans. (They are not restricted to annual periods of 2-4 months, but occur in a 30-31 day cycle). It is similarly the case in female chimpanzees. Estrus as a cycle averages 35 days, and mating does not appear seasonal. Goodall, "Ibid," 449, 451. (Vernon Reynolds and Frances Reynolds, "Chimpanzees of the Budongo Forest" in De Vore (ed.), *Primates*, 391, indicate the chimpanzee estrous cycle is 37 days.)

This much said, in closed, and more highly socializing spaces of captivity, gorilla behavior is significantly if not radically different, again very similar to humans. So that, for example, extensive foreplay (fondling each other's genitals), masturbation, play mounting, and even homosexual encounters are all extensively found. Schaller, "Ibid," 348, 352, 353.

¹⁰²Hall, "Aggression in Money and Ape Societies, 151-152- 154; Hall, "Social Organization of Old-World Monkeys and Apes," 23.

¹⁰³Hall, "Ibid," 24; Schaller, "The Behavior of the Mountain Gorilla," 341-342, for the gorilla.

¹⁰⁴Schaller, "Ibid," 345; Hall and De Vore, "Ibid," 70-71, 61-64; Hall, "Social Organization of Old-World Monkeys and Apes," 23, 24.

¹⁰⁵"Ibid," 20, 21, 28.

¹⁰⁶Hall, "Aggression in Monkey and Ape Societies," 151, 152.

¹⁰⁷See the discussion in Part III, below.

understanding aggression that it suggests. In the case of tools so-called, they are used defensively to ward off intruders that may well embody the potential for danger or harm. What is pointed to here is that aggression rarely leads to fighting, bodily violence. Instead, it is utilized in defense, appears as (dominant male) behavior intended to maintain hierarchical cohesion in the group expressed in ritualized display and threatening movements that may include vocalizations.¹⁰⁸ It, of course, will appear as a prelude to attack, but also in situations where a direct attack is frustrated, or cannot be carried out (say out of fear), in which case it is often directed elsewhere, redirected toward an animal of subordinate status within the group or even to an inanimate object (no different from the precognitively sedimented practices that form similar human behaviors).¹⁰⁹

Aggressive behavior is, as indicated, rare in relation to members of the same species. In inter-species behavior, and this is the second issue, it is far, far more common to witness mutual tolerance or just simply ignoring or avoiding one another. In a shared habitat such as a woodland savannah, groups of baboons, patas and vervet monkeys encounter each other without aggression or violence. Similarly, gorillas. Within that habitat, each group appears to know the limits of approach (proper spacing as we might say).¹¹⁰ And, even within a highly aggressive baboon group, tolerance is practiced even among adult males, for example, in foraging as the individuals are generally widely spaced and thereby avoid competition,¹¹¹ and the confrontational encounter that might follow.

This is not to say that there are not more aggressive primate species (again, baboons, also the macaque genera). There are. Yet such behavior is not ubiquitous or pervasive.¹¹²

There is little aggression in eating largely because hierarchy determines the distribution of food when not foraging, say, in the case of successful predation. (The baboon is an omnivore, consuming small mammals, birds, and insects as well as plants.)

Aggression is most often (not in all cases, or at least it is most pronouncedly) tied up with dominance. Here we are referring back to our discussion of adult males above. The situations may vary, but the aggression which concretely expresses the socially structural dominance most frequently involves priority in access to choice food or a fully estrous female. Similarly, this behavior appears as intervention in potential or actual injury, threat to or annoyance of a female with her infant or young by another female or a quarrel within the group. In these situations, the intervention may consist in a glance, a vocalization, or where these situation bears direct intervention a rarely injurious nip on the neck.¹¹³

In all this, we can state that it is dominance with its measured aggressivity that coheres the group, and that the group (society) is relatively stable with rare norm violations. The dominance is diffused throughout the society (group): The most aggressive primates such as baboons also have an elaborate system of appropriate behaviors that relate each to the other within groups and between groups. This, of course, eliminates much of the aggression and, with rare exceptions, fighting and, moreover, allows for large troops, genuine societies up to 200 members. Where it does occur, fighting is often initiated by adolescent males precisely because of their peripheral social position within the group. Among perhaps the least aggressive primates, gorillas, there is little in the way of belligerent behavior; it is hardly ever engaged in by the led male (who mostly signals his intent with facial expressions or subtle gestures, none too pronounced) and only occasionally in females in fights amongst themselves (largely ignored by all males).¹¹⁴

¹⁰⁸*Ibid.*, 149, 150; Schaller, *Ibid.*, 354.

¹⁰⁹Hall, "Aggression in Monkey and Ape Societies," 150; Hall and De Vore, "Baboon Social Behavior," 64-65. Schaller, *Ibid.*, 365, gives a brief account of the ethological theorization of the origin and function of this behavior. It occurs with as much regularity among humans and in the same circumstances, at least in the long history of divided societies (those with fixed places in a division of labor and, accordingly, a hard social stratification). Call it the psychology of the oppressed.

¹¹⁰Hall, "Aggression in Monkey and Ape Societies," 152, 154-155.

This extends to relations among different groups of rhesus monkeys. *Ibid.*, 156. For gorillas, Schaller, "The Behavior of the Mountain Gorilla," 340-341.

¹¹¹Hall and De Vore, *Ibid.*, 55; Goodall, "Chimpanzees of the Gombe Stream Reserve," 435-437.

Baboons and chimpanzees will eat in the immediate presence of each other, and will occasionally engage in behaviors that can only be interpreted as play. *Ibid.*, 436.

¹¹²Hall, "Aggression in Monkey and Ape Societies," 153.

¹¹³*Ibid.*, 153, 154.

¹¹⁴*Ibid.*, 154, 155-156, 161; Schaller, *Ibid.*, 354.

The peripheral position is also spatial. This may have had huge ramifications in the phyletic and evolutionary sense. See the discussion, Part IV, "Theory of the Transition from Animality to Humanity: Reconstruction of the Paleontological Conditions for the Emergence of a Novel Being in Nature," below.

Aggressive organization, it might be finally noted, does not appear to be the condition for "success" in a wide variety of habits. Rather, we suggest it is level of evolutionarily achieved intelligence and the flexible social organization itself that permits these species to reproduce themselves without regard to specific milieus or ecologies.

Animal Societies *Gorillas, Chimpanzees and Bonobos*

If the description of primates societies stopped here, its deployment as a reference point for the reconstruction and analysis of hominids might well sanction the conviction that male dominance in human history, and especially in bourgeois society (whether in work, in the family or elsewhere) was justified on the grounds of its "naturalness." *In its mere facticity*, the assertion is not without its moment of truth. But the conviction would remain patently ideological, for animal societies themselves offer a refutation of the claim.

The reality of hierarchy and aggression are seriously transformed among gorillas, chimpanzees and above all, bonobos.

Among gorilla females there appears to be no stable hierarchy, while dominance in gorilla groups as a whole does appear to be largely "linear," i.e., based on gender, size and prime adult age.¹¹⁵

Gorillas appear to be the most placid of all primate groups. They forage and feed leisurely and nap regularly. Schaller states, "the gorillas gave one the impression of having an independent and self-dependent temperament, appearing stoic, aloof, and reserved in their affective behavior."¹¹⁶

Gorillas also exhibit little in the way of aggression and a great deal of tolerance among various troops. This is noticeable because of the large territories that they crisscross and mutually share and occupy. Unlike other primate species (say monkeys of all species), there is no group to group avoidance behavior. Hall thought this sharing of common territory rises to the level of what is "communal." Among gorillas, the phenomenon of a young or full adult, "lone" male can be found. These are males which are not attached to a group permanently, for long periods of time (as much as six months) or who, with a group, periodically leave it for indeterminate periods.¹¹⁷

Among all primates, chimpanzees and bonobos are humans closest "relatives." This determination is anatomical and evolutionary (in the sense of "lineage") but it is not, significantly, social. There is, however, social significance that is otherwise missed, misapprehended and precluded by scientific observation (i.e., precluded because the theoretical assumptions mediating its apprehension are class-based and hierarchical projections of society into nature).

Chimpanzees exhibit far less aggressive and corresponding submissive behavior relative to other primates. They exhibit no linear hierarchy. They are loosely organized in temporary troops, and in these troops dominance does not appear. Males, not as interlopers, move between groups without exciting trouble. (In this regard, at 1:1 the ratio of males to females both young and adult, chimpanzees are unlike other primates.) But it is not just adult males: Albeit in smaller numbers, even adult females can be found unattached to any group. (They are often females with infants, and they are unattached to avoid the prospects of male infanticide.)¹¹⁸

Adult males, adult females and older juvenile males leave groups and rejoin them to such an extent that troops are constantly forming and dissolving and reforming, their structure always temporary. (As a group forms and moves together, dominance in the narrow sense is present as leadership, as in giving direction to the groups' movements during the day. Even here, though, it can shift from one individual to another.)¹¹⁹

But to return to tolerance. During mating periods, this kind of tolerance extends to copulation: Several males will mate with the same female consecutively. Such a situation is inconceivable among baboons.

Perhaps, though, tolerance does not extend to copulation, but starts from it. Here two points are germane.

First, we can note with Goodall, that it is really difficult to speak of socially defining aggression amongst chimpanzees, who appear normally sedate.¹²⁰ In fact, females choose males with which to copulate

¹¹⁵Schaller, "Ibid," 347 (and here also for lack of definable hierarchy among gorilla females).

¹¹⁶"Ibid," 355, 345-346 (citation).

¹¹⁷Hall, "Aggression in Monkey and Ape Societies," 160; Schaller, "Ibid," 341-343, 339-340.

¹¹⁸De Waal and Lanting, *Bonobo: The Forgotten Ape*, 122-123. Infanticide is discussed below, see "Population and Environment."

¹¹⁹Goodall, "Ibid," 451-453, 454; Reynolds and Reynolds, "The Chimpanzees of Budongo Forest," 400, 415.

¹²⁰Goodall, "Ibid," 451, 455, 456, 457; Hall, "Aggression in Monkey and Ape Societies," 159-160.

according to whether they are less, rather than more, aggressive. Again, this is particularly true of bonobos.

Second, among impregnated females with issues, it is reasonable to assert, actually it is obvious, that the male does not know his offspring (yet any given male knows all his brothers junior to him since birth. They will grow up together.¹²¹ This follows from the mother-male child relation. See below.)

We can bring these two points together, tentatively suggesting another direction for our analysis and reconstruction.

From the perspective of conventional animal society studies, the bonobo is a chimpanzee. It is not, and careful, multi-disciplined analysis shows it is a separate species. Relative to the bonobo, the chimpanzee appears overtly excited, excitable and even aggressive. So, bonobos really are sedate. How has this come about? The female plays a leading if not dominant role, controlling food and sex. (In the case of the former, food, a vast natural abundance within the tropic forests of what today is the Democratic Republic of Congo may be an evolutionary premise of these social and gender relations).¹²²

Males may, but generally females do compete, and on those occasions on which it might lead to fighting that fight does not as a rule result in death, but is resolved amicably... through different forms of sexual behavior and relating.¹²³ Among bonobos, sexuality is a form of sociality, that is, over the entire range of social relations it is engaged in to defuse tensions that arise between various species individuals and as a substitute for rivalries that, for lack of a better term, "sublimates" aggressive behavior. This appears as an outcome, one that otherwise would end in violence, that interacting bonobos find their way to¹²⁴ (i.e., it is a social outcome of the interaction, not some dumb or fixed, say "instinctual," determination of behavior). Sexuality, of course, is also engaged-in in the pursuit of gratification. (Bonobo sexuality is multifaceted. It encompasses, male-male and female-female as well as male-female encounters.

Females, indeed, are capable of achieving climax, and are receptive to males for nearly half their adult lives, unlike chimpanzee females who are receptive to males less than 5% of their adult lives.)¹²⁵

Sexuality in its various forms is learned (as the behavior of the young attests),¹²⁶ emphasis on its various forms; so, unlike human societies in which (production based) social division and hierarchy, inequality, and oppression and exploitation are violently resolved in aggressivity, belligerence and, if severe enough, in social conflict and war, among bonobos sexuality is diffused across all social relations constituting the "method" and form of the non-violent, non-brutalizing resolution of social problems, quarrels and potential discord and clashes and the aggression that arises in them.

In social and sexual relations, the female chooses the less aggressive male perhaps because he is more likely to be attentive to, not just protective of, her and her young. This would include foraging for the nursing female. It is an important consideration: Like humans, infancy and maturation in the bonobo is prolonged (at least four years).¹²⁷ This can be stated differently, in terms of the evolutionary development of *Homo*: The less aggressive male is one with less testosterone and, inversely, greater sperm production. Less testosterone means slower rates of maturation. Slower developmental rates mean, immediately, that the choice of an attentive male is crucial because the child is at risk for a greater period of its life (an existential helplessness reinforced by upright posture and the accompanying anatomical transformation of the pelvic region and production of a smaller birth canal) and they mean, over evolutionary time, larger brain and cranial size,¹²⁸ all of which is characteristic of the self-making of *Homo*, otherwise known as hominidization. Return to the chimpanzee and bonobo: Just as significantly for the theorization here, *the pervasive, or better socially structuring, character of female sexuality in all its ramifications is what both vastly restricts aggressivity, and with it hierarchy making social relations horizontal. If individuality emerging from species determination is what permits the chimpanzee and especially the bonobo to begin to go beyond natural determinism, it is the social character of female sexuality in and through which this determinism is transcended.* This is, significantly, grounded in the

¹²¹De Waal and Lanting, *Ibid*, 63

¹²²Here we can also note that though bonobos will occasionally kill a duiker (a small tropical forest antelope), meat constitutes roughly a mere 1% of their diet (*Ibid*, 66). This is of some evolutionary import. We shall return to it later.

¹²³For a summary analysis that demystifies the relations of competition (and fighting) to cooperation, see *Ibid*, 84-85.

¹²⁴*Ibid*, 28, 32, 108-113.

¹²⁵Respectively, sexual behaviors include mounting and thrusting, penis fencing and genital massage (male to male); genito-genital rubbing and rump to rump interaction (female to female); and, among others, ventral-ventral (belly to belly) as well as "doggy style" (male to female). *Ibid*, 102-104, 107.

¹²⁶*Ibid*, 126 (caption), 128-129 (photo), 130 (photo and caption).

¹²⁷*Ibid*, 94 (caption), 106.

¹²⁸Andrew Lehman, *Human Evolution: Evolution and the Structure of Health and Disease*. Chapter II, "Hominid Evolution" (n.d.). Accessed online at <https://www.serpertid.org>.

broader relations among females. Among bonobos, females prefer to bond with females, while male bonding does not occur.¹²⁹

The temporary nature of chimpanzee society extends to bonobos. Composition changes from day to day, even from hour to hour.¹³⁰ All relations but those between mother and infant are temporary: This extends beyond infancy, way beyond, as juvenile males even in their adulthood retain attachments to their mothers, and this even as adult males are rather peripheral to the core structure of the group. Thus, mothers and their infants always move together. Bonobo society is based on what is ethologically called a "fission-fusion" group, a large-scale, loose community of females with infants and juveniles, among which the adult males are not part of the group core and females without youthful offspring are particularly transient. These communities do not move together, wholly. They are composed of far smaller, numerous subgroups; the latter do not have fixed members. Females, especially younger ones, move between these smaller subgroups. The communities usually come together at night but move separately as subgroups during the day, but more importantly it is always within this larger community that movement between subgroups occurs.¹³¹

¹²⁹De Waal and Lanting, *Ibid*, 112-115.

Even if there is no line of development from bonobo to human (there is not), *bonobo sociality is of the utmost relevance to human society: The egalitarian transcendence in relation to hierarchy as natural determinism in bonobo sociality can be, in at least one very simple respect (there are others, more complicated), traced back to the straightforward fact that for one form (bonobos) the females, nurturing and raising the young, control sexuality as a social relation and on this basis social relations in their entirety. In contrast, for the others (numerous human communities), the males, taking little or no part in nurturing and raising the young, engage in predation...*

Writing for the Smithsonian, Paul Raffaele ("The Smart and Swinging Bonobo," *Smithsonian*, V. 27. No. 8 (November 2006): 66-75) explicitly suggests the egalitarian organization of bonobo society is overblown. "New research on the hypersexual primates challenges their peace-loving reputation"; "watching bonobos in more natural settings" researchers "have discovered that females are not necessarily as dominant as they appeared" in the sugar cane fields planted by Kano within their native environs; "the alpha male determines where the troop eats and sleeps when it moves," though the actual evidence brought to bear is at best contradictory, and at worse supports Kano/de Waal. Other than a single incident (mentioned below), which was the "first of several signs," no other evidence "that not all is peace and love in Bonoboland" (*Ibid*, 68) is described in or brought to bear on the article. The article is riddled with mystification. For instance, sugar cane grown in the native environs does not constitute a "natural setting" but the forest does, as if nature itself was unchanging (i.e. native sugar cane fields in bonobos' roaming range are just as "natural" as any other tropic plant.) "*Ibid*," 65, 73

Just as from the time of James Mooney's posthumously published (1928) *The Aboriginal Population of North America North of Mexico*, the Smithsonian has attempted to obfuscate, mystify and occlude the U.S. state's central role in the countless genocides of native peoples in the Americas claiming to this day there has never been more than a million people populating North America, it engages in similar obfuscation of the reasons and motives why bonobos occasionally refuse to ignore humans, and are sometimes are outright nasty to them, no doubt to disguise the US role in funding and arming, perhaps training, warring factions who preserve or provide large capitals, many U.S. based, access to copper, uranium, petroleum, diamonds, gold and coltan in central Africa. (Raffaele's big rap on bonobos, in writing he still appeared shocked and offended, is that on the first day of his parties' encounter with a bonobo group the "alfa" male throw shit at, and presumably hit, him.)

Bonobos are "smart" but it does not take an "intelligent" ape to recognize that *humans are dangerous, too often deadly*. One might think that even a "peaceable" and "loving" animal would recoil, protect itself and make every attempt to discourage intruders and defend their roaming ranges, if, for "the past few decades, bonobo habitat has been overrun by soldiers, and the apes have been slaughtered for food"; if, "Only 23 percent of their historic range remains undisturbed by logging, mining or war"; if "From 1996 to 2003, the country suffered back to back civil wars, and... bonobo territory... saw some of the fiercest fighting"; if, the "grim evidence of the fighting" included "rubber, timber and coffee" plantation "riverside buildings [along the Marringa that] are now deserted and crumbling, mangled by artillery fire and pockmarked by bullets" as the military "looted everything along the river" and soldiers killed bonobos for food (and sport, and perverse and brutally grim humor); if poachers have been such a problem that, though outlawed, the state has resorted to funding "cash crops such as cassava and rice and small businesses" to stop local human groups and individuals from the practice; if the traditional prohibition, a taboo noted by both Kano and de Waal, is dissolving as "young people" ignore it having been told by "outsiders" "since the war" that "bonobo meat gives you strength" as one in four now openly admit to eating it; if, in other words (Raffaele's words), bonobos confront *extinction*. "*Ibid*," 68, 71, 72, 71-72.

Of course, if bonobos, are mere primates, instinctual formation dominates learning, responses in fact are genetically prescribed ("naturally" determined) and not socially, if behavior and responses do not undergo experientially based change over time, if the animal is mere "en soi," if bonobos do not see their numbers decline and cannot recognize they are endangered, well, then, Marxists like Astarian and idiotic Smithsonian writers might wonder why they were slinging shit at them.

¹³⁰*Ibid*, 63.

¹³¹Kano, *The Last Ape*, 69-78, 163-209 (detailed elaboration and its ramifications); de Waal and Lanting, *Ibid*, 68

The bonobo is particularly important since, beyond anatomy, physiology and morphology, it is socially and affectively so close to humans. In respect to the bonobo, it has been pointed out that morphologically it is close (and closer) to the reconstructed australopithecine anatomy (than any living people),¹³² meaning not that the bonobo is more closely related to humans than any other being (phylogenetically, it is no closer than the chimpanzee) but that the bonobo anatomy may perhaps serve to more fully understand that last common ancestor. Perhaps, perhaps not.¹³³

Chimpanzees are also quite capable of utilizing "tools" for food gathering and, beyond this, for defense, in the manners described below. Yet chimpanzees lack the elaborate social organization of baboons and other primates, especially those where dominance and aggression place an important role.¹³⁴

Among chimpanzees, dominance does not exist as a social relation, merely in relations between individuals and here merely in the weak sense (i.e., largely as deference in eating); and, in the latter sense, deference is not always exhibited say, again, in eating where an adult male will occasionally simply eat alongside a juvenile male in some choice venue instead of pushing him away or expecting him to leave. Similarly, there is little or no grooming among the infants, little among juveniles, but is more common among mature adults, where it becomes regular and at times long lasting.¹³⁵ What is similar? In our view, both are a function of the weakness of the social bond in chimpanzee and, phenomenologically describable, the temporary nature of all groups they form.

In these respects, unlike all other primates and excepting the mother-male child relation, bonobos and chimpanzees form only the minimal of lasting social bonds and do *not immediately* constitute themselves as a "society." There is, however, another side to this: Unlike other primates, not only do foraging ranges overlap the various temporally formed chimpanzee groups in a region, chimpanzees are always alert to the calls of other groups, e.g., warnings concerning predator presence or merely a simple acknowledgment of the presence of other groups in the same range. (And, among *chimpanzees* there is another side to this, having to do with the practical intelligence and the beginning of a separation of individuation from species life described above, namely, a chimpanzee seeing danger may run off abruptly, *and mutely*, as the remainder of the group remains unaware of the potential threat).¹³⁶ At the same time, to our knowledge (admittedly our readings are limited, fieldwork so-called non-existent), only chimpanzees and bonobos individually greet one another.¹³⁷

Yet chimpanzees and bonobos exhibit their practical intelligence, as well amongst all primates their closeness to humans, in the distance they have traveled from instinct and associative memory. Even basic behaviors such as construction of sleeping "nests" and copulation must be learned by watching and doing.¹³⁸

(caption).

Fission-fusion groups, lengthy (3 year) postnatal development and attachment of the infant to the mother, and female migration are not exclusive to the chimpanzee and bonobo. These relations also characterize the social life of the black-handed spider monkey. *Encyclopedia for Life*, entry for *ateles geoffroyi*. Accessed online at eol.org/pages/323938/overviews.

¹³² *Ibid*, 25.

¹³³ Perhaps, but at best moot. To one side (molecularly), de Waal himself notes that "chromosomally, the bonobo is the most specialized African ape" and further notes that Stanyon, et al ("The Phylogentic and Taxonomic Status of *Pan paniscus*." *American Journal of Physical Anthropology*, 69 (1986): 489-498) also questions its alleged closeness (to humans) on these very grounds (de Waal and Lanting, *Ibid*, 185, n. 5). Similarly, in 1978, Andrienne Zihlman, et al ("Skeletal Differences Between Pygmy (*Pan paniscus*) and Common Chimpanzees (*Pan troglodytes*).", *Folia Primatology* 29: 86-95) proposed that the bonobo might serve as a model for the common ancestor of man and modern apes. (For the morphological issue involved see the footnoted discussion (n. 42) of Gehlen and Gould in this Part, "Historical Conditions of Superior Insight into Nature and Society," above.)

To the other side (paleontologically), the bonobo may be a truly paeodomorphic form (i.e., anatomically, it retains in its adult form juvenile characteristics). In the earliest, thorough investigation of its anatomical form, Harold J. Coolidge ("Pan *Paniscus*. Pygmy Chimpanzee from South of the Congo River," *American Journal of Physical Anthropology*, Vol. 18 (1933), no. 1: 1-59) found 19 infantile feature of bonobo morphology. Kano, *Ibid*, 23-26, 34. The assumption here is the less the specialization (with regard to, e.g., organs such as the hand), which amounts to saying the more primitive or juvenile the form, and the more specialized the "mature" forms that develop within a lineage, the closer that primitive form is to the ancestral state of the lineage. For a thorough discussion, see Steve Gould, "Dollo on Dollo's Law: Irreversibility and the Status of Evolutionary Law," *Journal of the History of Biology* 3 (1970): 189-212

¹³⁴ Hall, "Aggression in Monkey and Ape Societies," 161.

¹³⁵ Goodall, *Ibid*, 446, 470, where she indicates that grooming between adult male and female may last up to 2 hours.

¹³⁶ For practical intelligence and the beginning of species individuation, as well as the mute chimpanzee in the face of a threat, see the Prologue, *The Order of Nature*, "Phenomenology of the Essential Forms of Vital Life," above.

¹³⁷ Goodall, *Ibid*, 457, 467, 471; de Waal and Lanting, *Ibid*, 29.

¹³⁸ Goodall, *Ibid*, 448, 450.

Like chimpanzees, gorillas tend to leisurely graze on plant life (small fruits, bud, leaves and blossoms preferably), napping at least for one extended period (2 hours) during the day; though chimpanzees, unlike gorillas, are also carnivores, though not as a rule, and will trap and kill colobus monkeys, very young bushpigs and, reportedly, human infants. They also eat insects (e.g., termites, ants) and demonstrate a rather sophisticated usage, shaping them, of stiff grasses or sticks as tools in capturing the insects for consumption, and poking around in underground beehives for honey.¹³⁹

Animal Societies Summary and Perspective

There are several points worth making.

First, primate groups cannot be understood in terms of reproductive physiology. Biological imperatives so-called such as mating and securing food are not primary. Instead, it is behavior and the interaction of various behaviors that coheres these societies.¹⁴⁰

Thus, second, primate societies do not form for purposes of sexual reproduction or in a quest for food. They form and cohere for protection, in order to defend themselves (as individuals and families, where "families" equals mothers-infants or young from previous seasons), and to and secure the bond of this basic mother-young relation, against attacks from predators. This is seen particularly in societies without a permanent focus (a single male or groups of males), those which, under attack, disperse as males attempt diversions while females and young seek refuge or escape in forests such as those of patas monkeys. Call this "strategy" dispersal and concealment.¹⁴¹

Third, accordingly, we can note some of the evolutionarily formed advantages that flow from societal organization: Where males are dominant, they provide advanced notice of danger (warning cries) and protection; constituting differentiated roles that permit females to focus on greater care, and socializing, the young.¹⁴²

Chimpanzees also, unlike other primates, engage in more than rare instances of walking upright. They do so, if not for extended periods, when walking through savannah grass, when looking for an object or even a companion or rarely carrying something in both hands, and among juveniles in play and, on occasion, in brief ritualized form during courtship. "Ibid," 438, 439.

¹³⁹"Ibid," 440-443, 443-446, 448-449, 473.

It should be noted that the Reynolds, whose essay is based on fieldwork in the Budongo, a tropic rainforest circumscribed by Lake Albert in the northwest and the much larger Lake Victoria in the southeast (2° N latitude south to the equator), expressly state they had no observational evidence of chimpanzee ever eating meat or birds' eggs. "Ibid," 380.

¹⁴⁰Hall, "Social Organization of Old-World Monkeys and Apes," 15; Chance and Jolly, *Ibid*, 186.

¹⁴¹*Ibid*, 168, 188, 189, 182 (the authors call such groups "acentric" societies); Hall, "Ibid," 15, 16, 13.

¹⁴²Chance and Jolly, *Ibid*, 154.

The behavior of chimpanzee and gorilla females in relation to their young permit insight into the scope of practical intelligence (see "Phenomenology of the Essential Forms of Vital Life," above).

A gorilla female and her child engage in bodily contact for its own sake (the child come up to mother and leans against her; the mother reciprocals and places an arm around the child's shoulder). There is sensuous pleasure here (not just conformity to pattern given with species development) as well as reassurance (Chance and Jolly, *Ibid*, 133). The mother attends to her child even when it wanders a short distance toward another female. As the child leans against the female, the latter rolls over. Before her weight crushes the child, the mother thrusts her arm out and scoops the child up away from the danger. In another instance, a child old enough to ride on the female's back has a serious wound on a buttock. The mother cradles it without regard to its size. She does in such a manner that no part of the wound touches her. She keeps other gorillas at bay, not allowing them to touch the wound. And, a final example, a mother retraces her steps for about 8 feet through a tree in order to pull her 112 year old infant through a gap in the branches. (Schaller, "Ibid," 351; Chance and Jolly, *Ibid*, 134-145). Similarly, chimpanzee females (Goodall, "Ibid," 458-459).

The chimpanzee female provides protection against weather and topography: If it rains heavily, she cradles and hunches over the infant (as opposed to the very young grasping her underside or, after eight weeks, riding her back). Similarly, in terrain that poses dangers (branches, rocks), she responds in the same manner: So that, for example, the savannah gives way to a valley through which cuts a stream, and the valley is strewn with rocks. As the chimpanzee troop approaches it, the mothers shift their children from the backs and bellies, cradling them. The mother will also divide and share food with the young (unlike monkeys or baboons), and she will give up a banana to her child if it begs her for it. (Chance and Jolly, *Ibid*, 137, 138).

In all cases, the situations are open-ended and different responses are possible, there are no *a priori* given "correct solutions" to the problem posed by the actual situation, only experience and animal insight will generate an adequate response. In these responses, there is an element of anticipation, an expectation of an event which has yet to transpire and which re-orient activity. This behavior cannot be comprehended from an opposition of man to nature: The antithesis of humanity (as activity, negativity and freedom) and all other natural beings (as given, fully formed and behaviorally determined by that nature, hereditary, instinctually, whatever) is a false opposition.

Fourth, like all modern humans in the first hundred thousand years of our existence, primates have no permanent fixed abode. They are nomadic.

Fifth, while the occasional "tool" will appear a mere extension of reaching (i.e., the arm), among living contemporary primates there is clearly not the slightest intimation of an ensemble of techniques, a "technology," that might be operative and integrated into daily life.

Sixth, there is a certain "naturalness" in hierarchy. But it is not visible across nature. We can identify it with species determination: *The more practical intelligence (in the sense described in our Prologue) is developed, the more the species individual frees itself from species determination (and species determinism), the less significant hierarchy, and thus natural necessity, becomes as a principle of social organization.* Exhibited most compellingly in bonobos, we might say there is an evolutionary tendency toward liberating the individual from species determination. This movement is not teleological, for, as we shall see, it is hardly necessary that it be realized: With the emergence of agriculture with its fixed positions in a division of labor and the formation of a state, humanity over the past 10,000 years proves there is neither necessary direction that inheres in nature (i.e., in the movement from animality to humanity) nor one inherent in human history as such as it unfolds in the encompassing context of that nature.

Part III

Theoretical Considerations in the Study of Living (Contemporary), non-Human Societies

There are three major considerations that arise from the foregoing summary recounting of the structure and organization of contemporary primate societies. These are, first, a scientifically uncharacteristic, non-reductionist method and analysis, which is an operative premise and not a result of such study; second, a re-theorization of the classically understood (Darwinian), deterministic relations between population groups and environment; and, third, as a consequence a necessary reformation of the nature of genetic transmission and its determinants. All of these considerations have direct bearing on the forms of life we intend to further examine. Consider each in turn.

Experience and Experiment

in the Non-Darwinian Determination of Animal Society (Primates)

In *The Critique of Science* we formulate one, very crucial aspect of the relation of the modern science of nature (physics) to the bourgeoisie as the class which created it in terms of the import of experiment for the project the bourgeoisie pursues in history, namely, capital accumulation through expansion of production forces. Concretely mediated by that science, this project is neither possible nor realizable without it: In projecting nature as a mathematical assemblage of bodies calculable in advance, science is the theoretical anticipation of nature as a raw material reservoir for capitalist production,¹⁴³ and a sink for the waste resulting from both that production and commodity consumption.

But, as indicated, experiment is one, albeit decisive aspect of the modern science of nature. When researchers come to define an object for inquiry, it is methodologically physics (mechanics) they turn to for a model. And with method, they assimilate the epistemology (often intentionally) and ontology (rarely consciously) of science, including its atomistic reductionism. But, here, it is method with which we are immediately concerned.

What is really interesting about researchers pursuing the study of animal life is the uneven, merely partial assimilation of method. It is contradictory. To one side, great effort is made to ensure rigor, especially in the delineation of their object of study; and similar effort is made to generate quantifiable and quantitative results. Yet to the other side, while there is no desire to give up experimentation (and indeed copious justifications for it), there is acute awareness that one does not establish artificial conditions in order to construct an external view, to grasp the object in its unperturbed form, where of course all this means forgoing the production of "observations" that permit formulation of "laws" that, in turn, further allow the scientist to decompose, deconstruct and reconstruct (i.e., manipulate), utilize and dispose of the object.¹⁴⁴ (In this respect, the zoos in the cities of the metropolitan capitalist world go the furthest in reversing this, the direction of fieldwork; they are the precise analogs to laboratories of modern science.) Indeed, even as many animal society researchers operate with an overall incoherently Darwinian and

¹⁴³For purposes of the brief remarks here, pertinent discussions (there are others) can be found in *The Critique of Science*, Third Study, Part IV, "The Critique of Historicism," the Final Study, Part III, "Potential Productivity and its Critique" and the Conclusion, "Science and Capital."

¹⁴⁴See the remarks of Hall and De Vore, "Baboon Social Behavior" in De Vore (ed.), *Primate Behavior*, 72.

adaptationist, explanatory framework,¹⁴⁵ their effort to comprehend animal behavior societally constitutes for them an object of study which compels them to offer a non-reductionist account and pushes at them if only partially, and tacitly (i.e., without full consciousness) to go beyond the methodological (and ontological) limitations of the modern science of nature.

There are two considerations that shape this decision.

First, animal society researchers effectively realize there is no insight into the sociality of animal life as such if reductionist assumptions are similarly made and run rampant: Creating fully artificial conditions that do not govern behavior in nature will not do. But beyond this, there is, second, awareness, and there are reminders, of just what the pursuit of science for the sake of science (i.e., for capital) can entail.

Ronald Hall anecdotally recalls a situation that is illuminating. Recently he remarked (the article in which the remark occurs was published in 1964), "fighting broke out in a group of 17 baboons at the Bloemfontein Zoo when an 'alien' adult male and adult female were introduced into their midst." The consequences should have been anticipated. They weren't, for "as a result... most of the animals were killed or died of their injurious."¹⁴⁶

It was with a view to the investigations these researchers carry out for capital and to the spectacular venues (zoos) they provision, and, presumably, from events like these, that they learned they must reproduce and secure natural conditions (open spaces and grassland, alternatively woodlands, etc., in all cases, climatic zone appropriate vegetation, terrain, etc.) for the life they house.

Population and Environment

Overthrow of the Classical Darwinian Theory of Natural Determinism

In classical Darwinian theory, the environment, specifically food supplies (i.e., resources in the narrow sense), is an independent variable, population a dependent one that varies with climatically governed resource availability. Darwin himself apparently held a different position (but only seemingly so): On one hand, he repeatedly stated that, "conditions of life such as food, climate, etc.," "the direct action of heat, moisture, light, food, etc.," play some role, but only a minor one producing "very little direct effect" in determining species constitution.¹⁴⁷ Thus, organisms are related to their environment... and this relation is unilateral, from environment to organism... only by way of complex mediation, i.e., by natural selection based on competition and in the "limiting condition" the struggle for life, i.e., over those resources and access to them, that ensues.¹⁴⁸

Selection "acts" in nature by modifying and adapting living beings to their various conditions and places.

¹⁴⁹ What Darwin calls "natural selection" is a purely passive outcome of the action and interaction of species individuals in their various milieus. What is of the utmost significance here is *variation*: "For as all the inhabitants of each country are struggling together with nicely balanced forces, extremely slight modifications in the structure or habits of one inhabitant might give it an advantage over others."¹⁵⁰

These "extremely slight modifications" are what is meant by variations. The variations are "extremely slight" because natural "selection can act only by the preservation of infinitesimally small *inherited* modifications, each profitable to the preserved being," and natural selection "acts solely through the preservation of variations in some way advantageous, which consequently endure."¹⁵¹ Again, it might be stressed, the determination runs one way, from environment to the organism. It is determinism. Why?

Examine what the assumptions that underlay the position.

"Many more individuals are born that can possibly survive,"¹⁵² so that, "in the course of thousands of generations... individuals having any advantage, however slight, over others, would have the best

¹⁴⁵See *The Critique of Science*, Final Study, Part III in its entirety.

¹⁴⁶Hall, "Aggression in Monkey and Ape Societies," 155. Hall cites a personal communication.

The Bloemfontein Zoo is located in the city of the same name, today the capital city of the Free State Province of South Africa.

¹⁴⁷Charles Darwin *The Origin of Species*. New York, 2004 (1859): 20 (citations), 19-20, 78, 83, 112, 115, 117, 122, 138, 142, 164, 170, 318 and passim.

¹⁴⁸Competition in Darwin's sense (i.e., "the struggle for life") cannot be justified on the evidence he provides. See *The Critique of Science*, Final Study, Part II, "Struggle for Life: Evidence in Darwin's Theorization and its Critique" (two sections), below.

Similarly, in considerations of its actual role in evolution (instantiated by, e.g., Miocene hominids) it cannot be justified. Susan Cachel, *Primate and Human Evolution*. Cambridge, 2006: 71-72.

¹⁴⁹Darwin, *Ibid*, 112.

¹⁵⁰*Ibid*, 86.

¹⁵¹*Ibid*, 86, 96. Emphasis added

¹⁵²*Ibid*, 17.

chance of surviving and procreating their kind."¹⁵³ It is this that drives the whole process in the first place. Or, citing Darwin again as he provides us with a summary statement of the entire position. "As many more individuals of each species are born than can possibly survive, and as, consequently, there is a frequently recurring struggle for existence, it follows that any being, if it vary however slightly in any manner profitable to itself, under the complex and sometimes varying conditions of life, will have a better chance of surviving, and thus be naturally selected. From the strong principle of inheritance, any selected variety will tend to propagate its new and modified form."¹⁵⁴ Forgoing the bourgeois prejudices embedded in his thinking (profitability, but also efficiency economy in nature, etc.),¹⁵⁵ this is straightforward Malthusianism, or, as Darwin himself says, "Malthus applied with tenfold force" to nature as a whole.¹⁵⁶ It also cannot be sustained.

So, on the other hand, in studies of animal society the untenability of Malthusian determinism come to the fore. Chance and Jolly, for example, recognize this in attempting to define a self-limiting "mechanism" that controls the demographic density of animal populations.¹⁵⁷ They note that in rodents and mammals as well, in voles and squirrels and rabbits and rhesus monkeys, that populations fluctuate, rise over time and then suddenly decline. The authors attribute the decline to increasing densification of population within a limited territory and, *on this basis* to, a corresponding rise in agonistic behavior, i.e., they ground the phenomenon of sudden, rapid population decline in the social behavior of species *without* reference to available food supply.¹⁵⁸ Now, the term "agonistic" appears repeatedly in the literature of animal society studies, and it is appropriate because it conceptually moves strictly on the terrain of society, that is, refers to aggressive or defensive behaviors (or both) that arise from social interactions and social relations. The authors in question list the relevant studies¹⁵⁹ and the more cogent explanations among those that are offered for self-limiting behaviors. These include an increase in physiological disturbances that are brought on by the stress of qualitatively increased interaction and, in some cases, overcrowding, which can result in death (e.g., from disease, from vast increases in adrenaline stimulation) and in anovulatory disruption of fertility among females.¹⁶⁰ In all cases, the population declines do not transpire as a consequence, causally mind you, of increase population pressure on existing food resources but are response to social density prior to that point where available food even becomes an issue.

Yet in the classical Darwinian model, the only elasticity resources possess is natural in the strict, narrowly scientific sense: Resources, whether animal or organic plant life on which animal life ultimately depends, fluctuate with the adequacy of rainfall, sunlight, temperature, with, in other words, climatic and, broadly, geographic conditions. A balance is achieved between population and environment when the latter provides adequate food supplies for the former, in consuming all those supplies, to maintain a viable demographic density. Thus, for this, the classical perspective, there is a unilateral relation of population to environment wherein the chances for survival and growth of a population, understood in terms of the genetic prospects of the fittest individuals, is severely circumscribed, directly described in terms of, and expresses environmental limitations. This relation can be stated diagrammatically:

environment → population

The classical view is patently, as we have demonstrated, false. To boot, numerous examples can be set forth. In Madagascar, the lemur population fails to consume all the food available to it; and, on Eniwetok atoll, the crab population, nearly obliterated by atomic weapons testing, re-bred and achieved its former population levels by eating the outer fibers of plants to offset the poor supply of algae (also devastated by the blasts).¹⁶¹ Blue jays and squirrels in northern temperature climates in North America (45° N latitude)

¹⁵³ *Ibid*, 74.

¹⁵⁴ *Ibid*, 14.

¹⁵⁵ For a fuller treatment, see *The Critique of Science*, Final Study, Part II, "Natural Selection."

¹⁵⁶ "On the Variations of Organic Beings in a State of Nature..." in Paul H. Barrett (ed.), *The Collected Papers of Charles Darwin* (Chicago, 1977), Part II, 4-5, drafted in 1844 but not released (i.e., read publicly together with another paper treating similar material read by Alfred Russell Wallace) until 1858.

¹⁵⁷ Chance and Jolly, *Ibid*, 147-148.

¹⁵⁸ *Ibid*, 148-149.

¹⁵⁹ Some of these are collected and others are reviewed in a work by D.H. Stott, "Cultural and Natural Checks on Population Growth," reprinted in Andrew P. Vayda (ed.), *Environment and Cultural Behavior: Ecological Studies in Cultural Anthropology*. Garden City (NY), 1969. See, also our extensive analysis of the case studies discussed by Stott with a view to non-Malthusian, non-Darwinian and non-Mendelian determinations of animal existence, *The Critique of Science*, Final Study, Part V, "Progeny, Productivity, Resources," below.

¹⁶⁰ Chance and Jolly, *Ibid*, 148, 149.

¹⁶¹ *Ibid*, 149; Moscovici, *La société contre nature*, 172-173.

eat only the apparently most appealing acorns, leaving the rest, hundreds on the branches and falling from any given oak, to rot. In the same climatic zone, rabbits do not succumb or weaken in long winters with snow on the ground, but instead consume bark and other accessible plant material from leftover human-prepared foods (base ingredients pasta or rice, i.e., complex carbohydrates) disposed in compost piles, and wait patiently evening after evening for that disposal at the risk of death by (owl) predation.¹⁶² Thus, animal populations tend to achieve and maintain a viable demographic density despite loss of primary food resources and the variability of those resources.

Population density may increase in some special cases with increased availability of resources (resource density): The demographical increase is very large among Takasakiyama population of Japanese monkeys (*Macaca fuscata*), but this increase occurred under artificial conditions of intense human care. It is not a "wild" ("natural") grouping.

Moreover, other species such as the vervets of Loliu Island maintain their densities without regard to available food supplies, whether under conditions of food abundance and absence of all predators or less consistent food availability and the presence of predators.¹⁶³

While it not unreasonable to argue that there is a relation between food and population densities, the argument here (Darwin's) is incoherent, at best ambiguous not to mention that it proceeds on the basis of straightforward, unreflected adaptationist assumptions. For, even as animal societies confront less abundant food resources, they exhibit behavior and practices that have the appearance of a social "strategy" for meeting these conditions. Such is group division, e.g., among savannah baboons. Predators as a rule do not figure in this "strategy" as the new group takes up an adjacent or overlapping region or range.¹⁶⁴

Entire genera, gorillas and chimpanzee, fail to exhibit any presumed or alleged relation of unilaterality of population to environment (available food resources). In roughly triangular regions formed by southeastern Congo, Lake Victoria and Lake Tanganyika which the specific studies where the authors we reference have engaged in fieldwork, regions of copious food sources for these animals, in the 1960s gorillas were found to be present in a density of 2.4 per square mile, chimpanzees in a density of 2.6 per square mile.¹⁶⁵ (Operating in the lushly abundant vegetation of the Budongo tropical forest, the Reynolds state here the population density of chimpanzees reached 10 per square mile, still a far cry from, three orders of magnitude less than, human and humanized (cat, dog, etc.) densities today.)¹⁶⁶ In the Cuvette Centrale region of Equateur province on the Zaire River (contemporary Democratic Republic of Congo), Kano estimated the demographic density of bonobos at 1.4 per square mile.¹⁶⁷ It is patently manifest from the leisurely eating habits of these animals and from their respective population densities that the region could support vastly more of them.¹⁶⁸

¹⁶²The last two examples are based on decades of the author's own experience.

¹⁶³Hall, "Social Organization of Old-World Monkeys and Apes," 17.

¹⁶⁴*Ibid.*, 20.

¹⁶⁵Schaller, *Ibid.*, 333, and Goodall, *Ibid.*, 453.

¹⁶⁶Reynolds and Reynolds, "The Chimpanzee of the Bugondo Forest," 394.

¹⁶⁷*The Last Ape*, 58-59. The figure offered is .5 bonobos/km².

¹⁶⁸Darwin was wrong, not just evidentially as we demonstrate here, but theoretically with a view to his underlying Malthusian assumptions. Not only was he wrong with regard to the consumption of resources to that point at which they become inadequate to animal need, but, recall Darwin's remark, his "is the doctrine of Malthus applied with manifold force to the whole animal and vegetable kingdoms" [cited in *On Productivism* (St. Paul, 2008), "Constitution of the Full Sensuous-Material Premises of Productivist World (i.e., a Highly Rationalized Capitalism): The Agriculture Revolution Creates Conditions for a Malthusian Nightmare"]. He was wrong with regard to the enormous production of progeny that would always find a population outstripping available resources.

The theory itself is evidentially refutable: A male langur monkey that has defeated the troop's leader and takes over his female harem kills all their infants (de Waal and Lanting, *Bonobo*, 118, discussing primate infanticide). On Darwin's Malthusian assumptions this makes no sense: Hereditarily (genetically), the new leader may be inferior to the one he has defeated, the latter's progeny may be far more viable than that of the new leader, the defeated leader may simply have been old, but in his prime may also have exhibited far more prowess, animal cunning, etc. Since in (neo-)Darwinian terms, the carriers of different hereditary material (genotypes) in a population contribute differentially to the inheritance (gene pool) of the following generations, the troop, and the species, may well be the worst off as a result of the infanticide. This makes no sense on Malthusian-Darwinian premises (as was clearly recognized at the time, 1967, Yukimaru Sugiyama, a Japanese primatologist, brought the new evidence to bear on the scientific primatological community. There was an uproar and, of course, a good deal of denial. *Ibid.*)

The behavior (infanticide) has its own logic: The females who lost their infants became excited, copulating with the new male langur leader. Now the usual time for a return to estrus in a langur female is somewhat less than the 2 to 3 years after she delivers a new infant; but it is far less if she loses the infant: The infanticide effectively advanced her estrus. (De Waal, *Ibid.*, 121-122, offers a convoluted explanation of the male behavior in terms of sexual selection mediating

Summarily, then, among primate (and hominid) populations an established hierarchy and a settled distribution of functions (division of labor), which embody a set of species specific skills developed over generations of engagement in resources exploitation, allow different species to maintain a balance between population and environment, where narrowly understood resources (food) fluctuate between and, occasionally at, the extremes of scarcity and abundance.

Among primates (and hominids and humans), social organization, or structure, taken together with associated behavioral practices mediate between population (community) and environment, govern breeding, feeding, migrations and division of labor within their respective community, and effectively have a greater bearing on genetic development than environmentally mediated differential sexual reproduction.

Genetic Transmission and Species Constitution in Non-Darwinian Evolution

We eschew an adaptationist model of species formation in nature, whether it is straightforwardly Darwinian (unlikely today) or neo-Darwinian "synthesizing" the work of the old man with that of Mendel.¹⁶⁹ Instead, evolutionary development and speciation are to be generally explained from an operative biological orientation that characterizes all life (including non-speciating archaea and bacteria). The moments of this orientation are self-preservation, self-maintenance and self-enhancement. It can, further, said to be comprehended by the concept of autopoiesis, a concept which refers us back to the encompassing organization of all life as self-making and independent, an independence formed on the basis of prior dependency (primordial metabolism on the basis of inorganic molecules; vital feeling on the basis of sunlight, oxygen and organic molecules; instinctual, habitual and practical intelligence on the basis of vital feeling; humanity on the basis of all the foregoing forms; and all these orders of existence on its various forms with the Earth considered abstractly as a geophysical whole). Finally, at least from the order of animality (narrow sense) on "up," none of these moments are given immediately but are also mediated by the social organization of the form of life in question, among primates by society.

Species evolution is generally understood in terms of genetic mutation and transmission that is governed by the so-called "laws" of heredity. "Law" is a misnomer and a misunderstanding, utterly bourgeois, of contingency in genetic transmission. We shall return to this. Here we can simply note that "law" has the following meaning: It is an experienced regularity (or one that can in principle be experienced) that has the force of a binding rule to which we are subject without regard to will or intent. One speaks of the something having the "force of law" in society or, in nature encompassing society, a "law of nature." The dual mention of society and nature is important here, for the concept of law does not originally belong to nature but to bourgeois society. It is "discovered" in nature only as a product of an unknowing, unconscious or, perhaps, merely duplicitous projection.¹⁷⁰ Return to the "laws" of heredity.

Operating at the level of the organism, heredity is intrinsically conservative, hence the genotype, the existing genes whose sum total makes up the genotype, is stable. Gene mutation and, containing the genetic material, chromosome or more specifically chromosomal change is the source of evolution. Mutation "counteracts" this stability, as an opposing agency... Genes are composed of paired chromosomes which, in turn, consist of two intertwined chains, the famous double helix of deoxyribonucleic acid molecules (DNA) or polynucleotide chains. Each consists of a phosphate, a special sugar (deoxyribose) or a purine or pyrimidine base, adenine and guanine for the purines, cytosine and thymine for the pyrimidines. Each chain is held together by hydrogen bonds joining to the bases in a complementary fashion (adenine with thymine, guanine with cytosine), the chains

natural selection, but it is weakly premised and does not cohere.)

Finally, it should be noted this is not an isolated species-specific behavior: A number of species engage in infanticide ranging from lions to prairie dogs, from mice to chimpanzees and gorillas, to polar bears. The numbers are dramatic: In red howler and blue monkeys, grey langurs and gorillas, the number of all infants killed in this manner range from 29 to 43 percent (*Ibid*). Bonobos do not practice infanticide.

¹⁶⁹See *The Critique of Science*, Final Study, Part II, "The Modern Synthesis ('Neo-Darwinism')" in its entirety, below.

¹⁷⁰Referring to the rule of law embodied by a sovereign (whether an individual, an office or an institution such as parliament), it is Hobbes, above all, with whom the concept is systematized as part of an argument for which man, in leaving nature and entering society, subordinates himself to a sovereign. The concept is taken over in the early development of the modern science of nature, and has the sense grounded in mechanics (as the fundamental science) of the necessity to which all bodies are subject in a universe where bodies are the basic datum. From here, mystifyingly, it is (re)appropriated in the study of the determinants of capitalist society (formal domination) as natural realities. For further elaboration, see *The Critique of Science*, Third Study, Note, (*The Relation of "Laws" of Nature and Society to Consciousness*), below.

characterized by perfect complementarity or so it is said. When the double helix separates into two single chains, each reconstructs an identical copy of the original double chain. Permutations of the four bases with a chain constitute the range of possible genetic structures, so that any given cell contains tens of thousands of genes. Genes can mutate, but this is, in classical neo-Darwinian thinking, rare because genetic auto-reproduction is so exacting. Mutations happen at all because of the sheer volume of genetic reproduction that occurs. To formulate the conservative nature of heredity differently, perhaps more precisely, one might say given the vast number of operations the occasional mutation is a mathematical certainty. Mutations can be inimical to the organism, but then they are also on adaptationist assumptions the source of alternative organic features that give an organism and the species of which it is an individual an advantage in the "struggle for survival."

In neo-Darwinian thinking the visible expression of the genotype, say species coloration, range of height and weight, etc., or more adequately, the morphology of the species itself together with its organic structures and functions, is called the phenotype. The synthesizing of Mendel with Darwin produced in this regard a shift in the object of study, so that a population grouping (the species itself) and not the individual organism (as in Darwin) is both bearer of genotype and gives expression to the phenotype. For neo-Darwinians, this is the level at which natural selection operates. None of this changes the source of evolutionary innovation, namely, random mutation that positively affects the chances of successful reproduction, now understood at the level of the species and not the organism.

Now, there is no need to accept any of this. We certainly do not, and not simply because the relation of genotype to phenotypic traits concerns the most superficial characteristics of a species (or organism, as the case may be), for example, color of hair or eyes, secondary sexual characteristics, etc., or, alternately, the account of genetic transmission (i.e., the relation of genotype to phenotype) is incoherent, metaphysical if you prefer.¹⁷¹ And while what is decisive – the contents of consciousness, social behavior – cannot be derived from genetic analysis, this analysis itself is problematic. That is, the lawful nature of heredity itself is in question, for contingency has a central role in genetic transmission.

From the very origins of the "modern synthesis" (Mendel with Darwin), it was recognized that genetic "effects" are not simply the product of the relation of a single gene, its structure, but to its locational relation with other "neighboring" genes.¹⁷² There is no one to one correspondence between genes and their phenotypic effects (i.e., their relation to an organism's appearance and functions). In this respect, genetic determinism, causality, can only be asserted, not demonstrated.

There are, moreover, several ways in which contingency (i.e., that which is *non-mutational and indeterminate*) asserts its primacy in what is called heredity transmission.¹⁷³

The first is gene conversion. It occurs, in the narrow sense, as a small, mobile piece of DNA made of many nucleotide bases (often in the thousands) ... assisted by an enzyme called a transposase... detaches itself from, "jumping out of," the chromosome of which it is part. The gap left in the chromosome is filled, not by closing up but, as the same small piece of the opposite alternate parental chromosome (remember this structure is that of a double helix) unwinds and copies itself... also assisted by an array of host enzymes... as a template. The copy inserts itself into the gap. This DNA with the re-inserted segment is reproduced by mitosis, as each of two members of a pair of chromosomes are separated in sexual division and enter into two new individual progenies. The process of detachment can be repeated with each new generation, occurring indefinitely, and in this manner spread through the population.

A second genetic process is called crossing-over. It occurs as, and when, two chromosomes lying side by side undergo a break. This permits one end of one chromosome to connect up with the other end of the opposite chromosome forming two chromosomes, and involves the two strands of a double helix in each chromosome. The technical term for describing the two newly joined chromosomes is "mosaic." If the break does not take place in exactly the same places in each of the two chromosomes, it need not,

¹⁷¹*The Critique of Science*, Final Study, Part III, "Genotype, Phenotype, Environment," below.

¹⁷²Theodosius Dobzhansky, *Genetics and the Origin of Species*. New York (1937 (1 st edition), 1951 (3 rd edition): 13, 31, respectively.

Here it might also be noted that 98% of DNA is non-coding, having transcriptional and translational functions among other unidentified and unknown functions. See the article, "Junk DNA," by Jana Suurkula writing for Physicians and Scientists for Responsible Application of Science and Technology (PSRAT) at <https://www.prsrat.org/junkdna.htm>. In point of fact, evolutionary molecularists today (January 2020) suspect that "junk" DNA is capable of evolving into protein-coding DNA, and certainly now hold that approximately one-fifth of that "junk" actually regulates the 2% of DNA that codes proteins.

¹⁷³We re recapitulating and compressing a discussion that appears elsewhere. For elaboration see *The Critique of Science*, Final Study, Part V, "Indeterminacy in Genetic Determination," below, and the sources cited therein.

then there is an unequal exchange of genetic material, a crossing-over, from one chromosome to the other. Again, this has the effect of mutation without such having taken place, and, again, the genetic change can be spread throughout a population over time, over numerous generations, by mitosis.

For our purposes here, a final genetic process is known as slippage. This involves the internal chromosomal structure, the double helix, specifically the two strands of nucleotides that in part constitute it. In a short repetitive sequence where each repetition is likely less than ten bases, a "slip" can occur in the each of the two strands, so that there are only, say, nine of ten bases in the repetition matched to the each other with one repetition of each unmatched. What follows is either enzyme elimination of the unmatched repetition or, as in gene conversion, utilization of the unmatched repetition as a model or template to produce a complementary repetition on the opposing strand. Slippage is this occurrence as an ongoing process of the loss and gain of repetitions.

Among forms of DNA turnover, slippage is most common and most frequent: A gene can generate repeats that are different as to kind and are interspersed with one another. All three forms of DNA turnover can result in the replacement of a "family" of genetic units by a variant form, leading to generalization of the variant.

Now in each and all cases, these non-Mendelian forms of DNA turnover effect parts of genes, whole genes, or the regulatory region of DNA in a gene which contains several short stretches of bases bound to proteins (the regulatory "agent") that determine gene transcription. Each of these forms of turnover, when linked to sexual reproduction, can spread novel genetic variations... non-mutant, non-Mendelian genetic structures... through a population grouping over evolutionary time, without regard to natural selection, i.e., in a non-Darwinian manner.

The force of the presentation here is to undercut the adaptationist perspective that argues for a unilateral determination from environment to populations (species) that is decided through mutational variations in genetic structure to work to the advantage of the species in relation to other species in an environment whose fundamental structure (available food resources) is fixed (i.e., limited, and below levels of potential population growth) even as the environment itself changes.

Thus, on the (neo-)classical view, the survival and renewal of species life is determined by the differential reproduction of genetically transmitted, favored qualities enabling individuals (species) to adapt to environment changes. Genetic analysis can neither account for the emergence of new species (speciation), and species specificity (e.g., precisely what of that 1.6% of the total chimpanzee and human genomes that is not identical separates them) as well, nor can it explain genetic primary given the absence of causality in the relations of genome to environment.¹⁷⁴

For the perspective put forth here, on the other hand, the dynamism of social structure, not the fitness of individuals, is decisive for the continuity of the species in geological time. It is not a question of adaptation, but one of organization of social life in accordance with the triple vital orientation and its mediations that we opened this discussion with. It is only in this context that genetic structure is the "bearer" of changes – it codifies them – that originate in the dynamic relation of species groupings to their milieu, a relation that is determined by an internally, socially maintained population level, by socially transmitted behaviors and learned skills in appropriating the resources within the environment. On this basis, we can state that until a species has fully emerged, it is likely to revert to a prior condition, but once it has, its development as such is not reversible: Having been cemented, its genetic structure and inheritance, a plan on the model of its past organic development including once chance and non-adaptive, non-mutational - now standardized changes, will more or less dependably be reproduced in the future. But its structure (genome) - mediated by the whole evolutionary becoming of a species including (in the case of primates and hominids) the activity of species members themselves - cannot be said to be anything more than an evolutionarily constituted substrate which that history and society over time reach back into and shape.

Part IV

Speculative Reconstruction and its Critique, Hierarchy and Social Division

The premises of analysis of the appearance of man are theoretical, and speculatively historical in the specifically evolutionary sense. Unlike in Hegel's *Phenomenology*, here they are not neatly fused: They shall be considered separately with no effort made to force them together.

¹⁷⁴ *Ibid*, Final Study, Part III, below.

Theory of the Transition from Animality to Humanity

Reconstruction of the Paleontological Conditions for the Emergence of a Novel Being in Nature

Go back to what is called the last common ancestor of humans and anthropoids (the ancient great apes, or chimpanzees and gorillas). Retrospectively, it may as well be a proto-ape (or proto-chimpanzee). Maybe. In either case, it was the ancestor of modern apes and chimpanzees. In all likelihood, the ancient form was, structurally and functionally, organically different than modern ones.¹⁷⁵ It "looked" as little like those proto or early forms (anatomically, physiologically and morphologically) as modern humans look like modern apes. At some point a being embracing primitive, unspecialized organs diverged from the evolutionary stream. This being first visibly appeared and can be situated in the late Miocene, say 7 million years ago (10 million years if ancient apes, 6-7 million if ancestral chimpanzees), not long after the equatorial belt begun to contract (heralding the cooler temperature associated with the Pliocene) just less than 8 million years ago.¹⁷⁶ That being may be called *Salehanthropus tchadensis* or *Orrorin tugenensis*. It may not. It may be the later, better documented *Ardipithecus ramidus*, a being that can walk upright but is still capable of quadrupedal activity.

The name criterion (bipedalism) is probably inadequate.

Whoever it was, we do not have a name for it. But it is the retrospectively reconstructed "link" between that last common ancestor and the first of the hominids, the australopithecines.¹⁷⁷ Their fossil remains have been largely discovered in the east, central African region (the northern Great Rift Valley generally, the Afar region and in its southern reaches of the Awash River). They are better documented. They are numerous (*Australopithecus* anamensis, afarensis, africanus, bahrelghazali, garhi, sediba, aethiopicus, robustus, boisei). In this respect, what stands out is not the being that is reconstructed, but the mountain of literature that an overall scarcity of fossil remains has generated. This situation expresses the internal conflict of science and the archaeological sciences in question: Vast sums of money are poured into the work of renowned teams engaged in fieldwork. Reputations are made in years of digs, then perhaps lost in the disputes that follow. It is the outcome of vanity and pride, grounded in a desire for fame, glory and perhaps fortune. Fundamentally it is bourgeois egoism. (In a weight room this morning, my wife was nearly run down by a young man in a competitive rush to get to a vacated weight station. Wearing a cutoff tee-shirt, his right upper arm bore a facial reproduction of himself, his left the words "all eyes on me." Both were permanent tattoos. One need not be a great scientist, for bourgeois egoism is pervasive and ubiquitous. It is the normal condition. That is the point.)

Australopithecines first appeared as long as 4.2 million years ago, and disappeared perhaps 1.1 million years ago. In charting or mapping (literally), this form of being, we can represent and clearly see the asymmetric, nonlinear development. Many species overlap in geological time, perhaps some in space (i.e., perhaps sharing the same regions, even the same local ecologies). From the standpoint of the development of a specifically modern humanity, developmental nonlinearity is reinforced by the

¹⁷⁵"Postcranial differences effectively remove virtually all of the Miocene hominoids from consideration as ancestors of living species." Cachel, *Primate and Human Evolution*, 66. Cachel approvingly cites several researchers who argue (her summary) that "all of the East African Miocene taxa... have no modern analogs in terms of niche, and they have no descendant species (phyletic derivatives) in the modern world." *Ibid*, 67.

A critical analysis of primate evolution will not move scientific technicians one iota: These strictures are of no avail, as witnessed by the reigning paleoanthropological summation. See George Koufos, "Potential Hominoid Ancestors for Hominidae" (*Handbook of Paleoanthropology. Vol. III Phylogeny of Hominids*, Winifred Henke and Ian Tattersall (eds), Heidelberg (Springer Verlag), 2007, 1347-1377: 1353-1356), where Proconsul is given lengthy consideration as highly possible, though, controversial, ancestor of "extant great apes and humans" (*Ibid*, 1356). Proconsul is one of the large-bodied Miocene genera that Cachel warns about.

(Immediately antecedent to the Pliocene, the Miocene is a geological epoch dated from 24 million to 5 million years ago.)

¹⁷⁶Dating is not unproblematic: Older techniques are based on anatomical structures reconstructed from fossils, presupposing the entire sequence at least 30 million years into which a given find is inserted. New techniques arrive at what is called a "molecular clock." Molecularly extracted DNA *where available* is derived from fossils (and since the little DNA available dwarfs the paucity of fossils, there are large gaps in the time line). What is measured is a noticed linear rate of evolutionary change in amino acids (proteins) over time among difference lineages and species within those lineages. In crucial respects, the two diverge, producing two time lines. As an example, we can point to dating with regard to that moment at which the ancestral line of hominids diverges from that encompassing chimpanzees. In one case, *Salehanthropus* is placed prior to that moment, in the other after it. See the discussion in Part, "Meaning of 'Society' and Extent of Presence in Nature," above.

¹⁷⁷Here *Australopithecus* and *Homo* are treated as distinct genera within the hominid family. Such amounts to taking a position on an unresolved dispute within archaeology; the problem, however, goes far deeper than said dispute. See the following footnote.

numerous dead-ends, species that not only went extinct but without "issue," without a line of future, novel species development. Something very much the same can be said about *Homo*.

Alongside the later australopithecines, the first species of our, the *Homo* genus appeared (*Homo habilis*) perhaps 2.4 million years ago. The same paucity of fossil evidence obtains, and with it the same proliferation of literature and the alleged species it refers back to (*Homo gautengensis*, *rudolfensis*, *ergaster*, *georgicus*, *cepranensis*, *antecessor* *heidelbergensis*, *rhodensiensis*, *floresiensis*, *sapiens idaltus*), the same reputations and disputes, all rooted in the same bourgeois egoism. And here too the criteria – bipedalism, anatomical changes inclusive of the pelvis, further shortening of arms, lengthening of legs, jaw and dentition, increasing brain size, production and use of tools, even the rudiments of language, and even if all taken together – are qualitatively inadequate.¹⁷⁸

We'll not discuss all these species of man. Much of the evidence is too thin. Thus, those we shall discuss or simply mention (*Homo habilis*, *Homo erectus*, archaic *Homo sapiens*) as well as those species including subspecies) that were evolutionary dead-ends, are little more than retrospectively reconstructed ideal types rising from, constituted (ideationally produced) in reflection, in thought, as an essentialization from the mass of skeletally and hopelessly, insufficiently evidenced (remains of) individuals. This could well lead us nowhere. But, for us, it is not centrally at issue; instead, we shall (initially at least) orient ourselves on the basis of our earlier analysis of animal societies:

What in evolutionary terms, our reconstructions will then suggest is, *first*, that there is a relation between hominid evolution, climate and climate change and, *second*, that every successful hominid species of the genus *Homo* exhibited an increasingly complex sociality, which cannot be explained in Darwinian terms as an adaptation of population to environmental resources that are simply given, but must be understood in terms of *activities* that rearranged and remade by expanding resources, activities which over generations engendered anatomical, morphological and physiological transformations such as changes in dentition and posture that, genetically fixed, in turn transformed the species.

If we step back over 5 million years ago, in terms of an evolutionary reconstruction of humanity at its origins, we want to return to the primate societies that occupied the vast sweep of land, the African Sahara savannah.

We can start with the outer periphery of late primate societies, made up of juvenile males, largely engaged in food gathering of their own. This subgroup within the band is not "superfluous" (it plays with the young, will cry out if a predator is spotted), but in the immediate sense it does not contribute to the reproduction of the group as a whole. It does not breed. Peripheral both spatially and socially, it is not under the same pressure to integrate its activities with the rest of the band. In its foraging, for instance, it will explore more, stray from the group far further than is permissible among the females, infants and young. In this respect, it is imperatives may not always coincide with those of the band, especially the dominant males. We suggest that under the right conditions, those imperatives could come to be defined outside of the social matrix of the larger community.

The Sahara during the late Miocene was a grassland interspersed with the occasional treed ecology, large parts of all of which were occupied by primate societies. As the cooling of the Earth accelerated, we mark a change in earthly environment with a division in geological time, the Pliocene: The Sahara was converted and transformed into desert, pushing these primate bands and groups south, into new territory as the range of foods resources (plants, fruits, some nuts) shrank, some of them disappearing.

Foraging further afield, the field of action of the peripheral juvenile male groups expanded since food was not as readily available (the community at large already had the choice locales). A geologically rapid drop in temperature would have ruined vast areas of ground coverage, and edible foliage...

Something like this has occurred on many occasions in geological time, both before and after the moment which we are speculatively reconstructing. For instance, there was the mid-Miocene cooling which, geologically speaking, occurred abruptly (over about 150,000 years) between 13.5 to 14 million

¹⁷⁸This is an inadequacy that is rooted in the entire conceptual framework of paleontological studies.

Thus, the use of the terms "species," "genus" and "family" (not to mention the higher order taxa), like the category of phylogenesis (or that of ontogenesis with reference to "stages" of the formation of modern individuals), derive from taxonomical and evolutionary theorizations that, based on anatomic structural analysis of skeletal remains, are entirely uncritical with scientific pretensions to being genuinely theoretical, and are hardly adequate in and of themselves to grasp the specificity of any population grouping situated in evolutionary time, and in particular humanity as a novel form of being in nature. Their employment here is heuristic and convenient: First, they are not intended as fundamental concepts underpinning our theorization, rather their utilization merely permits us to pose, perhaps improving our chances of resolving, certain problems. With this in mind, second, they are well known, hence familiar and in this regard suitable.

years ago with a mean annual temperature drop in excess of 7° C (12.6° F).¹⁷⁹ Then there is the far more dramatic and far more recent younger Dryas, (12,000 years ago) that returned the higher latitudes in the Northern Hemisphere to glacial conditions. The Younger Dryas lasted for about 1,300 years. At its outset, temperatures dropped 5° C (9° F) in a geological instant (an extremely short period even historically speaking, a mere decade) and in warming again rose in perhaps a half century with a total 27° C (45° F) temperature swing...¹⁸⁰

Thus, during days peripheral juvenile groups roamed distances far from community sleeping sites searching for more abundant foliage. They would return to those sites at night. They did their foraging together, since, in sometimes unfamiliar territory, the chances of encountering a predator, a beast of prey, were magnified. We can ask ourselves, what perhaps among other things characterized these groups in opposition to the core band? The band lived in an ecologically more or less well-defined milieu, and the adult males in finding new locales, looked to the same ecology. What was characteristic is that they always ignored a certain part of the flora (and, to a smaller extent, the animals especially mammals present). This part may have constituted a potential food resource, but, as we said, it was ignored. This would not, however, have been altogether the case with the juvenile male periphery. By contrast, with the difficulty or simply the impossibility of obtaining the main or choice food resource, these males became more superfluous. Younger, given to exploration and pushed by necessity, at an indefinable, though early point, they, facing a far less bountiful milieu, minimally took to scavenging, finding carrion a palatable addition to their diets. In perhaps short time, they even began to engage occasionally, unsystematically, in predation. Pursuit of these new options, and with them the new range of resources now available to them, were likely further accelerated by a changing climate. Sooner or later whether by choice but, more likely, under conditions of the scarcity of food resources that the cooler climate, particularly a precipitous drop in average temperature, would have engendered, this periphery was forced to integrate all these options or disappear: It broke away from the community or was effectively cut loose by a contracted distribution of those resources. The result was, in either case, the same. Compelled to pursue in earnest all these activities, the once peripheral group formed itself into a distinct community. As a condition of this departure from the old band, the new community could not possibly form itself without females. Where were the females? Young females without children were "appropriated," not without a fight and only in fleeing. But at a certain moment and distance from the band, the older, dominant males could not have cajoled, fought and pursued without abandoning the core group. Of course, if this retrospectively reconstructed social structure had more of a chimpanzee or bonobo type character, a female or two would have led a few adult males out of the core group, the community. This entire movement did not happen just once among a singular band, but over and again, recurrently, as countless small population groupings confronted the same situation across contracting African plain.

At this point, foraging, scavenging and predation were fully integrated. We insist on the integration since, contrary to what is asserted by, say, Moscovici and, more pointedly, most archaeology of the latter half of the twentieth century, predation simply was not primary.¹⁸¹ In this respect, the level of hominid consumption of meat could not of itself generate and support the new skills and activities that were responsible for a major evolutionary transformation. Instead, in this whole movement it was these activities taken together and integrally that established on new foundations the unnamed creature who was the immediate ancestor to *Australopithecus*, to the australopithecines themselves.¹⁸²

As this new form of life undertook to systematize its activities on the basis of new plant and animal forms which, perhaps recurring in its new environments, revealed themselves as potential resources, new behaviors arose and became habitual... In this development, of course, the transmission from generation to generation within the new nomadic community of the same hierarchical relations between members did not cease. It remained central... New knowledges if you will, and new neurological, muscular and

¹⁷⁹Madelaine Böhmé, "The Miocene Climatic Optimum: Evidence from Ectothermic Vertebrates of Central Europe. *Palaeogeography, Paleoclimatology, Palaeoecology*, 195 (2003), 389-401: 389, 393. Accessed online at <https://www.elsevier.com/locate/palaeo>.

¹⁸⁰Wallace Broecker, *The Great Ocean Conveyor*. Princeton (NJ), 2010: 28-29, 110-113.

¹⁸¹See Patrick Pasquet and Claude-Marcel Hladik, "Theories of Human Evolutionary Trends in Meat Eating and Studies of Primate Intestinal Tracts," *Estudios del Hombre*, Núm. 19 (2005): 21-33.

¹⁸²Assuming they are distinct species, among them *anamensis*, *africanus*, *aethiopicus*, *robustus* and *boisei* australopithecines exhibit a layer of enamel over their teeth thicker than any of their predecessors. It allowed them to chew more difficult substances, but there is nothing in the jaws and molars that would indicate they were engaged in full time predation. Predation, at any rate, in the limited manner described here is a characteristic feature of later australopithecines.

sensory capacities also arose. These were qualitative changes. More to the point an once peripheral now new community had emerged: The practice of a sub-group had long ago organically transformed it in connection with the new abilities it developed and that distinguished it from the older, larger community; for example, its dentition underwent change in response to the tearing of meat away from bone of the carrion it scavenged. Again, at an indefinable point in prehistory, these gatherers and scavengers, having perhaps first experienced fresh meat captured in play, begin to pursue live prey, birds, small rodents or similar animals. Engaging in such predation even if unsystematic, the peripheral band as it was becoming a new community further distinguished itself: Bursts of speed to catch prey, since small animals are often fast over short distances, were better accomplished by upright pursuit, while, similarly, surveying a large, e.g., plain, was better accomplished in an upright posture; at the same time, elements of memory were linked to rudimentary foresight as it became important to note how other predators killed and prepared for such. Primitive tools, made of sticks for example, had to be fashioned. Again, transmitted from generation to generation as behaviors and practices, the achievement of new skills over time produced anatomical and organic changes in these beings (e.g., bipedal running as we already suggested, and as we have already noted shortening of the forelimbs and lengthening of the legs). These organic transformations became genetically fixed. New genera and new species appeared in nature.

Let's pause and briefly formulate the meaning of this development:

First, alternative food sources (gathering, no longer exclusive, had now become a co-equal source) and, engendering genetically fixed organic changes, new skills embedded in new communities of these beings created perhaps an unparalleled capacity to reproduce themselves socially, as beings in nature, i.e., in and through their own activity, their making, beyond the initial autonomy located in animal societies themselves, it presented them with a qualitatively novel autonomy in relation to determinism of the environment.

Second, in all this, hierarchical relations were not just carried over into the new community but they were reinforced by the activities of scavenging and hunting themselves and, more fundamentally, by the very reality of the group itself, by its successful establishment on the basis of its departure from the old animal community.

*Do Hunting and the Labor of Production Constitute the Only Forms in Which
the Paleontological Conditions for the Emergence of a Novel Being in Nature Originally Appeared?*

In the discussion of the paleontological conditions for the emergence of man we have leaned rather heavily on Serge Moscovici, perhaps unfairly but nonetheless necessarily for reasons that will become shortly apparent. Here we shall state what we see as the limitations and problems of this speculative reconstruction of a development based on hunting (cynegetization) that leads from the australopithecines to modern man. We, in other words, shall outline a critical assessment of this theorization of hominidization and suggest a coherent alternative. It is necessary to do so because in a fundamental way (i.e., in a theoretically reasoned, lucid and consistent manner that reflectively evaluates and grounds a position, our position) this reconstruction does *not* permit us to intelligibly grasp those animal and hominid communities that broke with natural determinism and natural determination. Moscovici was not the first to formulate the perspective we shall subject to criticism,¹⁸³ but his theory (and analysis) it should be noted is a "meta" summation and elaboration drawing out the implications of similar studies of animal societies that form the evidential body of the discussion above. It underpins the most ostensibly critical reflections on the origins of man that seek to understand her development as a being that is new and irreducible yet remains part of nature.

Not incidentally, we begin by reaching back to animal societies, to the ancestral "higher" primate groupings just "prior" to that moment when hominidization "got underway." Our emphasis in this respect is on the sociality of these groups, and the fact that the constitution of social bonds and their transmission are at the basis and the heart of primate groupings. This is not too different from Moscovici, though it appears to us that merely for the sake of his theorization he lays far too much emphasis on the altogether incidental consumption of meat by what are fundamentally herbivorous species.¹⁸⁴ This unreflective assumption, for that is what it is, cannot be sustained. In the first place, as we suggested in the remarks above, predation was not the central feature of the diet of these beings: The model for this

¹⁸³In a non-Marxist idiom, perhaps the first to articulate a position for which hunting was central for the "self-making of man" (our term, not his) was Raymond Dart in his "The Predatory Transition from Ape to Man," *International Anthropological and Linguistic Review*, 1: 5 (1954): 201-207. For Moscovici, see his *La société contre nature*, chapitre 3.

¹⁸⁴*Ibid*, "La cueillette des animaux," esp. 121-129.

view of predation and meat eating is once again based on contemporary primates, and of course humans. It assumes that a reduction in gut (intensive) mass provided by a "high protein" diet adaptively reduces gut size leaving greater food sourced energy for the energy expansive encephalization. Evidentially based analysis demonstrates this is not the case.¹⁸⁵ There are clearly other, non-meat sources (e.g., the pith from terrestrial herbaceous vegetation, fig like fruits among which are exceedingly large *Anonidium* and *Treculia* fruits): Certain plants in abundance for example, that are edible, are said to be quite palatable and offer high protein values.¹⁸⁶ Moreover, as we have already suggested, there are other possible manners in which cranial and brain size increased.¹⁸⁷ In the second place, caught, killed and devoured prey were not part of the diets of females and the young, and, on the basis of a hierarchical social structure, this would have been true even in the case of the juvenile male periphery that, having broken off from the larger community, established itself as a new band. In this respect, the level of hominid consumption of meat could not of itself generate and support the new skills and activities that were responsible for a major evolutionary transformation. (We might note, for instance, that in the case – precluded by Moscovici – where it is a question of occasional, unsystematic predation, as with chimpanzees today with a view to colobus monkeys, predation would have remained a wholly tertiary, infrequent activity carried out, nonetheless, exclusively by the young adult males and provoking no organic changes.) In the third place, hunting success is rarely consistent; it is, in other words, unreliable as a day to day food source.¹⁸⁸ At best, it would have been secondary to the consumption of plants, fruits, nuts, legumes and roots; more likely, it was tertiary to gathering and then scavenging.¹⁸⁹ A primary dependence on it would have spelt the end of a species. Fourthly, as the core group, or its split-off periphery, migrated southward as the Saharan savannah desertified, because they continued to rely on plant resources, fruits, eggs and insects, that migration would not have terminated until a more than adequate geography of food resources had been found, until one (plants), the other (meat) or, most likely, both were more plentiful: In the crucial formative period of the split-off-periphery-becoming-a-new-community (the period in which organic changes were initially established), hunting and predation would not have been all consuming activities then any more than they are now for, say, chimpanzees. The bipedalism allegedly achieved in hunting (and scavenging) could not, all over again, have generated and sustained the organic transformations that have been imputed to it. Instead, if the integrated suite of activities aimed at social reproduction we have described initiated some sort of transformation (in Mendelian terms), then for it to have become genetically fixed (e.g., the foot and pelvic changes necessary for ease in upright walking) the new posture would have to have been further integrated, integral in principle, into all activities of daily life, activities that characterized play, grooming and whatever other social forms of expression that characterized that life. And these activities themselves would have had to effectively reinforced social reproductive activities (predation, scavenging, collecting). Finally, and more specifically, if bipedalism did not arise in hunting, it need not also have arisen in

¹⁸⁵For a critical discussion of the whole question of the evolutionary significance of a meat diet, see Paquet and Hladik, "Ibid."

¹⁸⁶De Waal and Lanting, *Bonobo*, 65.

¹⁸⁷In chimpanzees, meat consumption is highly restricted; among bonobos, it constitutes about 1% of their diet; and, in gorillas, it is non-existent.

If we go back to that last common ancestor at the moment at which *Pan* and the being that would eventually become *Homo* speciated and considering that *Gorilla* and *Pan* are basically non-meat eaters, it would have been strange indeed that encephalization, far more likely to be generated by qualitatively increasing sociality, owed its elaboration to a meat-based diet. We repeat the evidence of gut morphology does not support the primacy of meat in the diet of contemporary analogs to hominids; and, to boot, the hunting model Moscovici (among others) adopts rests on a contemporary primate (the baboon) which evolutionarily is quite distinct from contemporary humans.

It is, then, not just quite strange that the divergence was settled by predation and hunting, but this perspective at once methodologically rests on the assumption that primacy in the explanation and comprehension of organic development (here encephalization) is accorded to and thus must be accounted for in "physical" (here chemical and molecular) terms; and it, this perspective, embodies current (bourgeois) prejudice (concerning the primacy of meat as a protein source).

The second feature can be stated differently: Only in a divided society where meat consumption is a mark of virility and status would its science so-called self-justificatorily project societal ideological and affective prejudices back onto its own evolutionary origins.

The whole perspective is incoherent, which the foregoing demonstrates and the following textual discussion will confirm.

¹⁸⁸This is clearly the case with contemporary hunter-gatherers (the latter half of the twentieth century). See Laural Bossen, "Women and Economic Institutions" in Stuart Plattner, *Economic Anthropology*. Stanford (CA), 1989 (328-350): 319, 321-322.

¹⁸⁹See J.F. O'Connell, et al, "Male Strategies and Plio-Pleistocene Archaeology," *Journal of Human Evolution*, 43 (2002): 831-872, for evidence of the primacy of scavenging over hunting.

surveying an open plain either in the search for prey (a claim which falls with that of hunting) or in looking out for predators. The latter assertion also falls, in this case because that unnamed being who constituted the first hominid, reconstructed beings such as *Salehanthropus*, *Orrorin* or *Ardipithecus*, and australopithecines all as partially bipedal, largely inhabited wooded terrain and landscapes.

Bipedalism may well have originated in the "search" for food, but not as in foraging or scavenging (or hunting); that is, not in activity that analogically (and falsely) is, among primates, most akin to our notion of work (abstract labor): Operative in the perspective we are submitting to criticism is a world (that of capital) in which resources are not immediately accessible, but are scarce or, in any event, are mediated by a commodity market, have to be "paid" for by way of a strenuous form of activity of social reproduction (labor). Rather, bipedalism may have originated in a world of abundance where the being in question was merely reaching, as in the bodily action of reaching, as in reaching for fruit. If we, like those who we critique, seek as an exemplar contemporary primate activity, then we can note that the chimpanzee and the bonobo stand, even occasionally *walk*, on two legs for purposes of reaching for fruit from short trees.

They deploy their free hands for balance, one free one reaching and plucking, then move slowly to the next tree. At this evolutionary moment, the anatomy of the being in question was better suited for standing than for walking.¹⁹⁰ (Then, too, there is the physiological issue of bodily cooling. On reductionist assumptions, it ought to be decisive that slightly warmer savannah temperatures, 2° C or 3-4° F, expose the entire backside and much of the head to heating and overheating by the sun, while standing upright a biped exposes far less surface area, only the top of the head.) Here, then a number of activities, including a change in climate, come together to compel a response, activity, that over generations generated anatomical change... Return to the critique of hunting.

The same criticism goes with added force with regard to proto australopithecines. These primates foraged among the flora, and on their peripheries there may have been scavenging. But as the periphery of young males split off, say in an extensive period of drought perhaps brought on by climate change (a general cooling of the Earth in the mid Pliocene), and began to forage on their own, scavenging and, in particular, the killing of prey did not play the decisive role in their overall activity that Moscovici attributes to it.¹⁹¹ While perhaps not insignificant, it was not of enough import to initiate changes in the morphology and anatomy of that proto australopithecines: This rather exclusive stress on it defies everything else we have reconstructed about their hominid successors for the past 1 1/2 million years. Summarily, with few exceptions (e.g., Neanderthals) they were primarily gatherers right down until the geological present (the appearance of man) and beyond (for the first 100,000 years of specifically human existence). Again, in daily life something else had to be present. An activity that, first, was a regular feature of that daily life and, second, that could have been carried out in a number of postures of which standing would have been engaged in the most frequently. That was the requirement. Something on the order of dance had to be a central feature of the culture of daily life to cement the modifications that might occur. The problem here of course is the kind of culture we refer to here is not "material," and does not leave sedimented or fossilized traces. (And, of course, with dance, with its rhythmic character, it is difficult to separate it from song with its rhythmic and melodic character. In other words, some primordial sort of utterances must be present at this moment also).

Moscovici does not grasp the role of climate change in precipitating strategies among hominids that accelerated their specific development. The criticism may be considered unfair since he published this work in 1972. However, the counter criticism itself is irrelevant because he operates with an encompassing framework that precludes consideration of intentional responses (of course, they need not be fully conscious) of this sort since he understands developments from the Darwinian standpoint of adaptation,¹⁹² in the worse sense of overpopulation relative to available resources, a sense of which his work is elsewhere critical. (Malthusianism raises its ugly head.) We have already shown that contemporary animal (primate) societies are not subject to these limitations, and on Moscovici's own assumptions, this should be equally valid for ancient primates prior to the appearance of the last common ancestor from which australopithecines take their point of departure in being. But in point of fact, climate change events (in the lengthy geological sense) have created situations in which hominids and humans were compelled to generate new strategies for appropriating their worlds.¹⁹³ This, though, is

¹⁹⁰Kevin D. Hunt, "The Evolution of Human Bipedality: Ecology and Functional Morphology." *Journal of Human Evolution*, 26 (1994): 183-202.

¹⁹¹Moscovici, *Ibid*.

¹⁹²"Le processus de sélection naturelle y a conduit par le moyen ordinaire des mutations génétiques favorables et des adaptations écologiques heureuses." *Ibid*, 96 and passim.

¹⁹³Brian Fagan, *The Journey from Eden: The Peopling of our World* (London, 1990), exhibits this relation well.

merely a specification of broader, general criticisms.

First, Moscovici's choice of baboons (and rhesus monkeys) as paradigmatic in the contemporary search for a model of hominidization reflects narrowness – it is merely one possible model – and expresses bourgeois bigotry (prejudice). Primates evince a number of different types of basic sociality, not just that of the *savannah* baboon or even it and that of the chimpanzee and bonobo (and black-handed spider monkey). Among hanuman langurs, though single male centered, the juvenile males leave the troop, forming all male nomadic and independent groups. They do not form a mere periphery. Hamadras and gelada baboons maintain a group structure and organization that is neither single male nor multi-male centered. A transitional form between the two, orangutans, live alone, a solitary existence. Ranging by themselves, a single male and female only come together in encountering each, then mating. Females and offspring stay together for 4-5 years, when the youth departs for the same solitary life.¹⁹⁴ Given the range of possible “models,” the choice of the savannah baboon is arbitrary or, better, is an expression of a culturally dominant, precognitive pre-judgment of what is normal and natural in human existence (the nuclear family in its original, broader patriarchal form), i.e., it is, as we said, bourgeois bigotry, projected into nature.

Second, the (savannah) baboon model only starts from bourgeois prejudice. On the basis of a vastly restricted number of instances, it inductively generalizes the fundamental character of aggression for all forms of animal sociality and relations. (Actually, the generalization is a rationalization of a position that is simply assumed and thus projected, again, not merely as typical, normal and natural, but as universal:.) The premise is aggression as the point of departure for every possible social relation (a view often later justified with a reference to fixed “instincts” absence all plasticity). Aggression is the foundation of behavior of all animal life. (This view, of course, has its elaborations, e.g., in territoriality; among humans, a hypostatization of one historical form, the nation state of capitalist modernity.) Aggression is restrained, rendering sociality at all possible, through relations of dominance and subordination. Each of these assumptions (as logical developments of basic aggressivity) are evidentially “falsifiable,” but they live on precisely because they are so utterly congruent, derived from the competition between individuals whether fish, reptiles, canines, felines, primates, humans, etc.) that allegedly best explains sociality and species reproduction. But, once more, this is merely the assumption of the universality of bourgeois society, of antagonism between competing capitals in its fundamental institutional context, the “economy” or, speaking in a more rigorously theoretical fashion (following Hobbes), of the *bellum omnium in omnes*.¹⁹⁵ In evolutionary theory, it is Darwin, with his explicit Malthusian premise of unlimited potential productivity (hence increasing demographic density) operative among populations confronting limited resources, who has most systematized these premises and who can in this respect be regarded as their

¹⁹⁴Kano, *The Last Ape*, 67-69.

¹⁹⁵Kano, *Ibid*, 13, 15, has the merit of noting these basic assumptions without, of course, recognizing their unjustified character.

As Kano points out this incoherent theorization originates contemporarily with Konrad Lorenz.

Lorenz brings together some of his specialized studies in easily accessible form in his *On Aggression* (New York, 1966. German original, 1963) where, if nothing else (there is precious little else), he has the merit of explicitly stating his basic assumptions.

Grounding himself in accounts of coral fish (*Ibid*, 3-22), both as observed in nature (in the seacoast off Key Largo, Florida) and in laboratory experiments (his aquariums where is able to subject his fish objects to tests, sometimes fatal, of his hypotheses), various species of female ducks (*Ibid*, 58-62), turkey hens (*Ibid*, 117-119), the night heron (*Ibid*, 121-122, 153-156), the brown rat (*Ibid*, 158-164), the Egyptian goose (*Ibid*, 180-182), the graylag goose (*Ibid*, 182-215), and various other species of fish, insects, birds and mammals, Lorenz offers his reader the full reductionist program where, on appropriately modified (Mendelian) Darwinian premises (i.e., as a neo-Darwinian in the broad sense, *Ibid*, 13), human behavior in all its forms is explained from these “lower” forms of life. The explanation arrived at is based on inductive generalization (*Ibid*, xiii). Never mind, epistemologically it is not even fully scientific (*The Critique of Science*, Third Study, Part II, “Two Problems of the Theory of Knowledge: Demarcation and Induction”). The fundamental explanatory concept is that of instinct, fixed, utterly non-plastic instinct, which is the true product of evolution (i.e., selection and mutation, *On Aggression*, 87) and in the plural achieves an interaction that is reciprocally balanced – thus, subordinating the “empirically” observed basic datum of behavior, aggression, to species preservation and preventing it from overflowing in wanton killing.

Beyond presenting his theorization, Lorenz's purpose in this particular work is therapeutic (*Ibid*, xi): In the hope of rectifying “aggression in man [that] has gone ‘wrong’” (*Ibid*, xiii), he offers (*Ibid*, 220-274) us an account that will dispose “of certain obstacles which prevent many people from seeing themselves as a part of the universe and ...[recognizing] that their own behavior too obeys the laws of nature” (*Ibid*, xiii).

Already appearing in popularized form, this pap too has its rabid vulgarizers, foremost of whom is Robert Ardrey (*The Territorial Imperative, The Social Contract*).

We eschew the Darwinian, neo-Darwinian and scientific viewpoints first, because, they cannot account for the circular or, if you prefer as we do, dialectic causality that is already operative in life even in its most primordial forms; and, second, because, on atomistic and empiricist assumptions, these points of view are incapable of grasping that each order of being that emerging in nature constitutes a new, integrated level of reality which, in a formulation we have used here before, establish its autonomy on the basis of its dependency on "earlier" forms in nature, i.e., that can only be adequately comprehended and explained on the basis of the new principles its appearance in nature itself establishes, because the existence and reality of this new form is strictly determined by those principles. Moscovici's presentation in this regard is contradictory: He expressly proceeds on the basis of a neo-Darwinian (Darwin mediated by Mendel) and adaptationist premises while demonstrating, even in part theorizing, their inadmissibility and irrelevance¹⁹⁷...

To begin, while it is closer to the truth to say "man" became man in becoming a hunter (i.e., such a position recognizes the autonomy of social relations and activity in evolutionary development of humanity and is not subject to censor for anatomical reductionism), in the same vein it would be far closer to the truth to say that we, as humans, "descended" from a population of gatherers. Among primates, hominids and human, this has something to do with the absences of aggressivity and hierarchy in hunter-gatherer nomadic groups, emphasis on gathering.

Hierarchy and Social Division, Natural Determinism

The dominant tradition among those which take animal studies seriously is focused on hierarchy. But it is just one tradition. There is another tradition within animal studies which, also starting from the intrinsic sociality of primate societies, is counterposed to the traditions encapsulated in the literature referred to here.¹⁹⁸ But it has operated on the margins of science, preoccupying few researchers, and has been not merely peripheral but generally ignored with a view to the insights that have been won. For it, the analyses of the now conventional tradition – *call it a hierarchical model* – are largely ideological. They characterize only that perspective which more than less *affirms the central narratives within bourgeois civilization*. We shall refer to it, the latter more diffuse, marginal studies as those that devolve on a perspective that proposes that there is at least one animal society based on an *egalitarian organization of relations within the community*. This perspective also asserts, we might add, that this animal society is far closer to man, and closer in ways that go far beyond the anatomical analysis that is carried over from the reductionist premises of the bourgeois sciences of human origins shaping the dominant model. Let's start from the non-reductionist, non-bourgeois perspective developed in the foregoing.

Species determination is natural determination.

While we shall have occasion to return to this proposition, here we shall recall the phenomenology of vital forms, noting that it is only as an individuality begins to emerge in nature that species determination begins to be broken with: This only occurs with practical intelligence, and the more it is developed the greater the possibilities for individuality. Perhaps it does not, but it should go without saying that individuality does not refer to personality for the latter evolutionarily appears among much "lower" forms. (Contemporarily, before we ever get to primates, it, personality, can be seen in mammals such as woodchucks, and in particular in domesticated animals such as cats and dogs.) Individuality has precisely the meaning of a departure from species determination, as animal activity that acquires understanding without regard to the number of attempts to learn whether successful or failed (i.e., where associative memory or instinct is no longer solely operative). Operating below the level of practical

¹⁹⁶For our critical assessment, recall Part III in its entirety, above.

¹⁹⁷Finally, there is Moscovici's objectivistic understanding of subjectivity in nature, and in particular humanity as nature: It is certainly wholly consistent with those ostensibly critical reflections on the origins of man as they appear scientifically, in Marxian theory, in general, as moments of the horizon of bourgeois civilization. Here, though, merely consider Moscovici himself: In his theorization, there are no needs that posit goals, no objectives that are chosen and pursued, no options or alternatives that point to and, as more or less realized, devolve in different courses of developments. History for Moscovici is not at any given moment a field of possibilities, albeit circumscribed, for the various social groups that constitute a community or society. History and human society are just an irruption in nature, another force of nature without intent or direction, even as the latter itself is made (i.e., is not given but has to be produced). With respect to this issue as a whole, it is obvious that Moscovici embraces science (openly and explicitly) and capital (tacitly) in an entirely uncritical fashion.

¹⁹⁸This is the study of bonobos.

For the soft stratification, what is often called "rank" among primates (and, misleadingly, among humans also) and its extent among these apes, see de Waal and Lanting, *Bonobo*, 72-78, 82.

intelligence, domesticated animals surely exhibit personality, and in many respects similar to humans, i.e., in compulsive behavior.

Return now to and summarily review the discussion of animal societies.

As we have indicated, primate groups are not unorganized, nor are they individualized. In contradistinction to both notions, modern primate groups, like humans, form communities that are, by now it goes without saying, at once social and in most instances highly structured, the important exceptions to vertical structure being gorillas, chimpanzees and bonobos.

In most animal societies (monkeys and baboons exemplifying what is too often believed to be typical in nature), the relations among individuals are *hierarchically* structured: For example, certain types of baboons are organized around a leading male or leading males to whom females of reproductive age or potential and females with the young they nurse gravitate. Around this core group can be found other females with their pre-adolescent young. Non-reproductive juvenile males are situated on the periphery.

The relation between these groups, especially leader(s) and females, is one of strict subservience of the latter to the former. Learned and regularly and characteristically exhibited, habitual behaviors (e.g., grooming, play, foraging) provide the context within which this subordination forms, within which status is accorded and, thus, within which resources are distributed. The core group and its immediate periphery are fully integrated: The leading male(s) make all decisions especially if the group is threatened by danger (beasts of prey) or engaged in migration. But they also make decisions that involve places to sleep, areas to daily forage in, etc. The females and their young take their signals from these males and act accordingly. *While this is only one form*, it often appears to be the pervasive one of social organization in animal communities.

Forms of status and deference in everyday behavior that are well-established taken together with an array of such skills constitute a "tradition" which, reproduced through the daily activities of the group and assimilated therein by the young, is thereby transmitted from generation to generation.

Though these are customary ritualized behaviors, they, and the skills developed (muscularly, anatomically) are not "instinctual" but are socially learned; nonetheless, they are characteristic of all the various social groups of a species. Dominance and submission are not, strictly speaking, species behaviors, and hierarchical structure is not instinctual in the common sense. (It is not inherited or genetically transmitted). Yet it very much "looks like" it is; its appearance in nature is inseparable from a being which remains a species being.

Hierarchy in society and with it social division (fixed positions in a social order as the basis for distinct groups within that order), like species determination, is natural determination; it is society in nature that has yet to emerge and distinguish itself as society in nature.

Difficult to separate in daily life (and separable, ameliorated and ultimately abolished only in a practice illuminated by consciously intentionality, and only as that practice is objectified and institutionally embodied in daily life), hierarchy and social division are natural determination and natural determinism.

Encompassing anatomy, morphology, physiology and, beyond these organic determinants society, natural determinism is that which has evolutionarily cohered "higher" forms of life and being as they have appeared on Earth. It is only in animal societies where a polymorphous sexuality, affective bonds and female-centric sociality become genuinely significant for the structure of the group that overcoming natural determinism with respect to hierarchy and social division becomes possible.

Hierarchy and social division in one of its two great forms, as soft (the other as hard and stratified), first appeared in ancient primates (ancestral apes). Reinforced by hunting and as part of a hunting heritage (exhibited in tools such as axes and knives, present in the bones found in campsite middens), such division and its attendant hierarchy was carried over and characterized the long lines of our ancestors.

These include hominids as hunters and gatherers, and they include ourselves, modern man (*Homo sapiens sapiens*) as she first emerged roughly 110,000 years ago. (Here one might also make the case the Neanderthals in particular were subject to hierarchy, social division and natural determination as *hunters*: In a male-dominated society characterized by sexual dimorphism, they depended so heavily on killing large herbivores for food.)

Yet, as species determination began to relax in the same hominids, as spirit still shrouded in nature began to emerge, to the extent gathering predominated we might expect that equality in social relations also asserted itself, that natural determination was in part overcome: For hierarchy and social division is first a *fixed hierarchy of males over females*, then one of adults over juveniles (and infants).¹⁹⁹

¹⁹⁹We can only look to hunter-gatherer communities as they have appeared in history and as we have witnessed them. So that on this we basis we can state:

"Even the male-hunting and female-gathering model overstates sexual dichotomy in food contributions, particularly

But return to hierarchy, social division and natural determination. Evidence that justified this aspect of our reconstruction of human origins has been uncovered in the distribution of grave goods (the abundance of fox pelts or jewelry relative to its paucity or absence from grave to grave) and in the structure and relative size of temporary shelters and encampments among ice age peoples who populated the Upper Paleolithic (45,000-10,000 years ago): Archaeological evidence points all over again to hierarchy, a soft stratification within large numbers of nomadic hunting and gathering bands. Thus, for scores of millennia, hierarchy and social division appear stable in some if not all distinctively human groups, especially those which were existentially dependent upon hunting.

Then something new occurred:

Beginning 10,000 years ago, humanity moved in two opposing directions, and in so doing "recapitulated" in novel ways the two fundamental forms of societal organization among primate animal, hominid, and nomad and specifically human societies. Based on the different, limited time men and women engage as hunter-gatherers and as gatherers, in sedentary archaic communities an albeit functional and temporary division forms within a daily context:²⁰⁰ *We stress sedentary social existence, for at this moment a new form of sociality first emerged and with it egalitarian social relations were strengthened, hierarchy was largely suppressed. Neither permanent nor determinant, this is, in fact, the softest form in which social division appears in our reconstruction. It is not fixed, it is not permanent, and it is institutionally circumscribed in the personage of the chief, an institutional embodiment of a communal intent to suppress social division.* For in the history of humanity, it is here and, and with "irrefutable evidence" only here, that the reproduction of a vertical cleavage and a specific social linkage is effectively broken for the entire seven million years that reaching back to ancient primate societies stretches forward to the historical present. For, at the same moment that archaic communities appear – since they appear as a countermovement – *another new form of sociality - rigid stratification based on the agriculture at its origins, with it a sphere of production and fixed position in a division of labor, and on this basis the state - rose characterizing modern humans as civilized. Hierarchy and hard social division - the concrete expression of natural determinism in humanity that has yet to be unmade – too were (enormously) strengthened...*

For now, we must return to the account based on material culture in terms of that moment at which *Homo* first appeared.

Part V

The Origins of Consciousness, Work and the Production of Ideality

Hunting became possible once hominids created the means to defer consumption of a carcass on the spot. Dismembering and transporting, and then even storing for a brief period entailed the fabrication of tools and the creation of new methods to cut up and preserve the kill, and to make distinctive use of skins and bones.

These activities go beyond the being that is *Australopithecus*.

While a number of methods and skills had been transposed here, from predation to hunting, a qualitative change had occurred as, in the structurally active sense, predation ingresses into foraging and scavenging, achieving a co-equal, integrated status as one of the central activities through which this being reproduces itself in nature: The systematic conjuncture of activities this necessarily involved placed hominid existence on new foundations. New tools, and new skills, immediately began to appear; and ear, eye and hands achieve a new order of coordination as these new skills developed. So that what appeared, if you will, in one field of perception (tactually to the hand) was simultaneously present to the

between animal and vegetable foods. Sexual divisions of labor are often flexible and overlapping in both individual and cooperative efforts." Laural Bossen, "Women and Economic Institutions," 319.

Moreover, women often provide principle foods and quantities. The sexual division of labor is often more complex also: "...most meat in the forager's diet may come from small animals and birds that are beaten with a stick, club, or stone, trapped in logs, caught in snares, or slain by some other animal. The techniques of capturing many small mammals as well as less glamorous menu items such as frogs, turtles, snails, eggs, grubs, and insectors are used by women and even children on occasion. Hunting parties, as among the Mbuti of Zaire, can also be formed by groups and men and women who cooperate in surrounding game, and in various societies individual women have become known as capable hunters. Moreover, hunting success often depends on the skills of dogs, as opposed to those of men or women." "Ibid," 321-322.

²⁰⁰See Pierre Clastres, *Society against the State*. New York, 1978 (1974): 83-107.

Clastres, having made a thorough investigations of archaic communities and having penned the most incisive reflections concerning social division, has nothing to say about the presence of social division predating the appearance of archaism.

others, the unity present in touching reproduced in gripping, chipping and pounding, requiring great hand-eye coordination, in other words, an evolutionarily constituted unified field of perception in which objects in their objectivity appeared as such was constituted anew on the basis of novel activities. At the same time, an indicative, performative speech was laboriously elaborated: Beginning, perhaps, with the reproduction of animal sounds as lures or distractions, followed by reproduction in audible form signals that are akin to gestures, such vocalizations led to the detachment of sound from bodily envelopment, and eventually to the constitution of ideality (here, words embodying meaning distinction from their referents). A vocabulary rooted in and "clarifying" aspects of group gathering, group foraging, and the hunt was thereafter utilized in planning details.

Over thousands of generations of hominid gathering, foraging, scavenging and hunting, these practices elaborated as new skills, new aptitudes, and new tools, led to anatomical, morphological, functional and organic changes in this being. The forelimbs shortened and the hand developed an opposing thumb, the cerebral cortex was enlarged and its functions multiplied. A vocabulary specific to each activity, yet interconnected, became practically systematized through speech. We can offer greater specification. Bipedalism itself led to further, qualitative anatomical changes. In the activity of acquiring greater and greater balance, of sensory-motor coordination in standing, walking and running, the inner ear underwent transformation. *Australopithecus afarensis* (Lucy) exhibits an inner ear structure that differs from primates: She has three semicircular canals at right angles to each other. They are central to her, and our, balance. In the middle ear, there are three bones (stapes, malleus and incus), the first which originally appeared in early *Homo* (ergaster), its "footplate" similar to modern humans (creating a sensitivity to higher frequency sounds, and in this case higher than australopithecines and modern humans). But there is more: The demands for balance, for sensory-kinesthetic control (*activity* generating greater cranial capacity and larger brains) means, among other things, a novel center of gravity controlled by muscles that respond to changes in motion, that adjust, if you will, the body as a whole, that autonomically and constantly regulate and re-regulate position maintaining a dynamic balance.

Bipedalism demands the integration of movement of legs and arms, hands and trunk, a larger bottom (gluteus maximus) relative to primates, and at the same time a separation: The arms and hands are freed from a movement that merely "corresponds" to the movement of the legs. It further requires a more compact, structurally a more restricted birth canal in females, while in fact bigger brains should have required a larger canal. Thus, in humans we have both larger brain development which for the most part is postnatal²⁰¹ and a smaller birth canal, meaning that during postnatal development socialization practices will uniquely shape this being.

Might the rhythms and good form that is essential to walking and running have been reproduced in the melodic and rhythmic emission of sound, in archaic singing, or, might have the melodic and rhythmic archaic singing been reproduced and assisted walking and running as they developed through the activity of *Homo*? ... The larynx, a valve constituted by the vocal cords, is far lower in the throat as a result of bipedalism: Not only can it now be closed off, permitting air to build up, and while opened emitting sound, this lower position dramatically increases the range of producible sounds (and, as the organic "substrate" of sound, makes possible the production of vowels and consonants). But at the same time, air behind a closed larynx stabilizes the entire lived body, permitting the chest to function as an anchor for the arms (arm muscles).²⁰² In physicalistic terms, a bigger brain is a necessary consequence.

In our terms, the capacity for social interaction and language elaboration are heightened which, dialectically, will require a still bigger, more functionally integrated brain as the organic substratum of activity, and at a certain moment consciousness... Let us attempt to reconstruct in a broad, a general way how this total (i.e., ontological) transformation occurred.

In our reconstruction of man in the broadest sense, *Homo* at her origins, there are two features of this new being that require our attention. This first concerns the origin and meaning of consciousness, for it is consciousness that transforms and reorganizes the whole reality of this being. The second concerns work, or if you prefer labor in the broad sense (as opposed to its abstraction as waged labor under conditions of capitalist production). Specifically, we are concerned with its limitations, which amounts to circumscribing its alleged universal significance in the determination of the being of man.

We seek to provide a detailed analysis of the origins of consciousness and the genesis of work (labor) that goes beyond the reductionist materialism of modern science. In this respect, we shall be guided in

²⁰¹Leslie C. Aiello, "Terrestriality, Bipedalism and the Origin of Language" in W. Runciman, J. Maynard-Smith and R. Dunbar (eds.), *Evolution of Social Behavior Patterns in Primates and Man*. Oxford, 1996 (269-290): 279.

²⁰²"Ibid," 280.

part by the work of a Vietnamese communist, Trần Dục Thao,²⁰³ and in part by a methodological orientation to consciousness which, as *fundamentally Husserlian and phenomenological, takes it (consciousness) as, once constituted, irreducible.*²⁰⁴ In this respect, we adopt a phenomenological determination of consciousness, which is both faithfully descriptive and superior and for which it is precognitive intentionality, a temporal stream of experience in which an object other than itself to which it intends together with it itself are simultaneously present or directly disclosed (i.e., objects are not constructed e.g., from "sense data"), and this prior to any self-consciousness: It is the structure of lived experience wherein a simultaneous relation thematically to an object and non-thematically to oneself constitutes consciousness. Consciousness appears as the unity of this awareness of the object and a tacit consciousness of self. We shall pursue this more fully in the following section.

The same, non-reductionist approach to the production of ideality will characterize our discussion of work in the second section below. Here, we shall discursively attempt to go through the various "stages" in the genesis of work, where the latter is understood specifically as a creative "labor of production" in and on the basis of which an ideal, typical shape guides the fabrication of instrument from raw materials to hand, materials simply given by nature (for example and especially stone originally utilized in making a bifacial hand axe, choppers, etc.). What is important here is twofold. First, we must base ourselves on the archaeological record, on the artifacts and residues that have been carefully uncovered in archaeological exploration of hominid sites. From these, from their shape and the nature of their construction we can, second, infer back to the activity that produced them, reconstructing the forms of the development of ideality as well as relating them specifically to the forms of development of consciousness as will have already been recounted in the first section of this discussion.

The Origins of Consciousness in the Sociality of Acting, Hominid Groups

Work specifically does not produce consciousness; rather, it is activity and an activity which is antecedent to work, not directly connected and not immediately a feature of it. Thus, we shall note (though, in point of fact, it should be understood as a matter of course), consciousness is always embodied, the consciousness of a practico-sensible or a sensuous-active being.

We have distinguished consciousness in terms of its intentionality, that is, as an awareness of self immediately directed to objects (including others) that are at once indissoluble from it, not immanent to it and are other than it (as opposed to, say, sensations that, having been passively impressed on a physiological organ, the eye or the brain or the one as a function of the other, are "in" it; or, alternatively as opposed to critical Idealism for which these sensations function as raw material out of which objects for awareness are constructed). We counterpose it to, thus distinguishing it from, the sensory-kinesthetic awareness of animals for which the presence of object is determined by drive or instinct, which is the evolutionarily adapted physiological-psychologically formed "criterion" of relevance of objects and environment, and which, inseparable from the drives and affects, permit the object to come into "view" in the first place. Here *Homo* permanently, as it were, went beyond animal existence.

This situation begins with gestural indicating, not a straight-armed pointing out of this or that object, but a semi-circular movement of the arm and hand, my arm, as I move it in an arc toward the object that I require you see. Pointing is the abbreviated, fully constituted and completed form of this original motion.

Thus, from the get-go the constitution of consciousness has its genesis in an inter-relation and in activity. It is not merely hunting in which this activity consisted, for what develops in predation is in this respect complemented and reinforced by previous forms of activity, watching for predators and foraging at great distances from the grounds of the core band, that reach back respectively to animal societies and to that being who, remaining unnamed (i.e., unidentified) connects primates to earlier hominids (australopithecines). In particular, once hominids appear, because as activity it is i "collective," it is this watching while foraging at great distance which really strengthens the import of hunting. For what is important here is that consciousness is situated in the activity and interaction of groups of hominids and originates and develops socially as practical language, as speech. This much said, we shall focus on the social activity of hunting as exemplifying (though not encompassing fully or even adequately) the development (consciousness) we are reconstructing.

If one lags behind the others in hunting, or one strays too far from others in foraging, others may call her - vocalizing while indicating the game or indicating movement closer to the group - with a gesture of the

²⁰³ *Investigations into the Origin of Language and Consciousness*. Boston, 1984 (1973).

²⁰⁴ Of course, for Husserlian phenomenology consciousness is not itself constituted in the genetic sense: It has no origin in forms other and "lower" than itself, what we call animal sentiment of self (or if it does, an assertion that would be tantamount to phenomenological apostasy, they are inaccessible in principle).

hand in a circular arc. At the very moment the subject begins to return the gesture to the others... she does so because reciprocity is already established in the group at a precognitive level, kinesthetically-sensorily if you will... she finds herself in contradiction with her own position as a lagger or as out too far: In returning the gesture, she no longer can do it by simply reversing the movement of the gesture, from herself to the group. For to do so would have no meaning: She is the lagger or out beyond the periphery. Instead, she repeats, reproducing, the identical gesture and sound that was a signal and vocalization aimed at her. We stress she repeats gesture and call, which in fact and really is a call to herself, i.e., she calls herself to rejoin the others.²⁰⁵ This reflexivity is a moment, in a structural sense one of two indissoluble moments, of consciousness at its origins.

Trần analogizes this situation with one which in some form we are all familiar, thereby providing a rather compelling account of intersubjectivity or the socially subjective basis of the origins of consciousness:

This calling to himself which takes up the call of the others is immediately realized on the vocal level, for the exclamations which answer one another blend like a choir. When we sign in union, our own voices seem to come as much from the others as from ourselves, and we hear their voices equally resounding in us. The case is the same for the prehuman subject who takes up the exclamations of his group; everything happens as if his voice came to him at once from others and from himself.... [The] subject hears his own voice coming from the others as in himself.²⁰⁶

This is crucial, so let's explore it further. It is, as the analogy suggests, the identity, or if one were to insist (we do not) the confusion, of voices (and, or, gestures) that immediately constitutes for the subject an action that is self-referential. The hominid who is lagging, or who has strayed too far, is not required to indicate the object to other members of the (hunting, foraging or scavenging) party, for she identified with them by voice. Instead, in the gesture she, having reproduced their motion in indicating from them to herself, completes the gesture in reproducing their motion from herself to the object (the prey, the centralized locale being foraged, the dead carcass). The dual structure of the gesture with its vocalizations anticipates and engenders the dual, inseparable moments of consciousness, for the subject (the lagger, the individual beyond the periphery) returns upon herself merely in order to move, motion, from herself to the object. As Trần says, she is both giver and receiver of the same gesture. The gesture as a whole together with vocalization produce in herself a unitary awareness of herself and the object.²⁰⁷ Herein lies the genesis of consciousness in its specific form or character: The gesturing-vocalizing action produces in the subject a unitary awareness of the object and self, a structure itself that constitutes experience as lived.

Work and the Production of Ideality The Road from the Rift Valley

Let's begin with a few words on the concept of ideality, as it is understood both philosophically and in Marx. Ideality in its fully developed sense (as it is, say, used by Marx in *Capital*, I)²⁰⁸ is a designation of the status of meaning, significance, sense. It has both epistemological and ontological import.

Epistemologically, that is, with regard to what we know and the manner in which we know, we produce concepts (a meaningful essence shorn of its particularity and contingency, a cognitive practice otherwise termed ideation understood productively as *Wesenschau*) in and through which we comprehend and explain events, processes, practices, relations and things in society and nature in order to act in and on both.²⁰⁹ In point of fact, most of the concepts we operate with are unreflectively assimilated in the acquisition of language, an active and a laborious effort (even if not recollected as such) undertaken in childhood. In producing concepts (ideality, meaning) we capture and fix the sense of the thing, relation, event, etc. This means that consciousness is never receptive, passive, a medium that reflects things, relations, events, etc., of an "external" world. Ontologically, ideality is statement of a status or, if you

²⁰⁵Trần, *Ibid*, 10.

²⁰⁶*Ibid*.

Though we do not accept Trần's designation of the subject of this activity as prehuman, nonetheless the same activity of choir-like voice synchronization can be found in contemporary, non-hominid and non-human form in bonobos. de Waal and Lanting, *Ibid*, 32.

²⁰⁷*Ibid*, 10-11.

²⁰⁸Marx, *Capital*, I, 5: 1: 193.

²⁰⁹For full elaboration of ideation, concept and activity, see *The Critique of Science*, Third Study, Note₂ (*Dialectic of the Concrete*), below.

prefer, the status of concepts is ideal: Ideality signifies a distinct shape or form (eidos) that because of its distinctness can be grasped as such and regularly produced. This distinctiveness and regularity are what guarantees its universality as reproducible *ad infinitum*, secures in other words, its universal accessibility, i.e., available to any being capable of the socio-historically specific speech in which such meaning or sense is originally constituted. At the same time, it is social, non-sensuous and non-spatial, which does not mean that ideality is (or concepts are) "located in our heads." Ideality is itself an aspect of reality, where the latter is in its most immediate aspect the world of daily life and practice. Ideality is reality's other side, its non-sensuous, non-spatial element or realm produced by man, by human beings. Taken together these determinations render ideality objective in the fundamental sense. If you have trouble with this, just ask yourself, "Where is cyberspace?" Or, alternately, if working from scientific (reductionist) and materialist premises, you find this unacceptable, pray tell, find me a concept by slicing open a physiological organ, namely the brain...

Concerned with fully intelligible meaning, meaningful ideal content can perhaps best be approached through an analysis of the ontogenetic and phylogenetic elaboration of a syncretic sentence at the basis of the birth of language, as does Trân.²¹⁰ Here we proceed from two assumptions, first, that ideal meaning is not fully intelligible unless it is fully contextualized, a sentence is required to express complete meaning, a position which we think is unassailable; and, second, since the origins of language in hominids is simply not directly accessible to us, one important manner in which it can be reconstructed is on the basis of its appearance in human infants. In the literatures of evolutionary theory, paleobiology and child psychology, this assumption is very close to a highly controversial perspective, one stated thusly, "ontogeny recapitulates phylogeny," meaning that the stages undergone embryonically in the developing human being reproduce the stages of the development of its evolutionary predecessors (in the taxonomical sense, reproducing the *decisive forms* that characterize the various kingdoms of organisms in geological history).²¹¹ In a nuanced way, we mean and intend something qualitatively different, namely, the stages undergone postnatally in the developing individual human being reproduce in a compressed, "schematic" and limited manner those developments of greatest import to the genus *Homo*. The very possibility of entertaining this perspective rests on the uniqueness of hominidization, and the evolutionary consequences for humanity. Once an upright posture is achieved, the resulting being is possessed of a (far) small(er) pelvic opening, meaning that only small human infants can pass through the opening, i.e., we are born while still immature, not just physiologically and anatomically but in every respect, in particular without formed affective, drive or instinctual and cognitive structures (thus, we are socialized, socially formed or humanized). As it stands, human children alone (since all hominids and other *Homo* species and individuals are now extinct) required prolonged material care to compensate for this relatively short gestation period in the womb. This evolutionary fact itself magnified the complexity of social interaction (ensuring that the latter in the form of work and activity would reach back and shape human biology as it evolved), and is largely responsible for the uniquely human feature. This is fully worth a seemingly diversionary exploration:

The prolonged postnatal development of human infants means our formation not only takes place (as it also does among higher primates) on the basis interaction with society (and culture) mediated to it first and foremost through family, clan, etc., but it also entails an unspecified relation to the immediate environment: All other forms of developed animal life experience this environment in terms of tugs and pulls emanating from it mediated by their own kinesthetic-sensory organization: Effectively, humans do not have an environment at all, and are absent specialized drives or instincts (or, in a technical sense, those drives or instincts are indeterminate, not object specific, "chaotic," and can thus be harnessed... the psychoanalytic term is "sublimated").²¹² Rather, it is through activity and speech that human beings overcome this, as it were, "instinctual deprivation" and, in remaking immediately surrounding nature, form

²¹⁰ *Investigations into the Origin of Language and Consciousness*, Second Study.

Syncretic here means confused and indeterminate in meaning because only partially formed, as, for example, analogously a biface stone, worked on one side only and possessing confused or mixed shapes (a natural one and one worked over or formed by labor). Such does not yet exhibit a regular, ideal shape, a shape that guides that labor of production and can be regularly reproduced on demand through that labor.

²¹¹ The assertion that, in fact, ontogeny recapitulates phylogeny assumes the irreversibility of evolutionary development. Thus, it ignores the evidence of neotony (i.e., juvenilization, or the appearance in "higher" forms, e.g., man, of less developed or unspecialized forms of, say, organ development). For this, see Stephen Jay Gould's early theorization, *Ontogeny and Phylogeny*.

²¹² Perhaps the first person to really explore human "instinct" in this technical, indeterminate sense was Margaret Mahler in her work in the New York state's hospitals and asylums among children who were thought "insane." See her *On Human Symbiosis and the Vicissitudes of Individuation, V. I, Infantile Psychosis*. New York, 1970.

for themselves a world, a cultural and material universe of meaningful symbols and use objects that constitute the components for the active reproduction of social life...

Methodologically, we could suggest this approach (relating postnatal human development to that of the stages of the appearance of species with the genus *Homo*) be employed heuristically, as a working hypothesis the validity of which is to be demonstrated by the outcomes of his analysis; but, in point of fact, without the assumption the analysis cannot get off the ground, cannot be undertake and hence fails... So, we'll bluntly state the relevancy, efficacy and, in part, validity of the assumption is contingent upon the coherency of the analysis... Let's return to work.

Evolutionarily, work is not possible before hominids appear, anatomically without bipedalism. Yet this is only a premise: Of qualitatively greater import in work, we must, again, must distinguish between sensory-kinesthetic animal awareness and consciousness. That is, we must distinguish between a being for which objects come into view only as a function of the drives and affects given with their evolutionary adapted physiological-psychological constitution to one side, and the consciousness of a being for which awareness, precognitively mediated (e.g., by affect, desire, need), is a field, a temporal flow of lived experience consisting in its simultaneous presence to itself *and* a directedness to objects that are other and detached from itself.

For the animal, say a monkey, the object of instinct or drive "plays the role of the major center of attention and ... the dominant pole of the total dynamic field of perception."²¹³ Even where an "instrument" is employed, a stick to push a piece of fruit closer, it functions as an object of need, not work (labor), an element within the simple act of direct manipulation.²¹⁴

While the early hominid... this is the activity of *Homo habilis*, the "handy man," the man who with his hands creates and utilizes tools... goes beyond this situation, it does not operate with a clear image, that typical, ideal shape which guides the fabrication of the object. The "simple representation," a functional image of the instrument, is materially embodied in the stone that is cut, say on one side only and that one side is the useful side. The stone, then, has a natural, given face (which may effectively not be a side to the extent the stone is of a naturally occurring irregular shape) and a useful face formed through striking the sides several times to achieve the desired effort. The shaped side is by far the smaller part of the stone, so when considered with a view to its fabrication the general shape of the stone is ill defined and predominantly natural, the instrument is prepared so to speak only in an embryonic sense.

... A digression is in order here.

Trần characteristically insists all this is the activity of a late prehomimid australopithecine. It is not: At Olduvai, "irrespective of the nature of the deposit," the evidence for associating *Homo habilis*, not australopithecines, with tool making is overwhelming. We quote Philip Tobias at length:

"(1) at every australopithecine locality at which stone tools occur in close association with hominid remains, there is evidence of the sympatric co-existence of a more advanced hominid;

"(2) at all sites where we find the co-presence of *Australopithecus* and a more advanced hominid, there too we find stone tools;

"(3) at every site where stone tools are found, along with associated hominid remains, these hominid remains include a more advanced hominid, whether or not australopithecine remains are present in addition; [and]

"(4) at every early site which has yielded a more advance hominid, stone tools are present."²¹⁵ ...

The desired effect is to fashion an instrument to be used in dressing the carcass of a dead animal, one that likely the early hominid had come upon. (In our reconstruction, one that is not fully shared by Trần, they are at this point in evolutionary time, merely scavengers.)

We have not yet reached that "stage" of the "labor of production," but here have only the "work of elaboration," the "elaborated instrument" worked on by another instrument still lacks a typical shape.²¹⁶

Work requires the shaping of an instrument, in the case of the hominid a stone, that in turn will mediate between the need and its satisfaction. The fabrication of the second instrument is, then, what counts as work for it here that the need is, so to speak, set aside, in our terms suppressed (Trần speaks of a *diffusion of need*), precisely in order to satisfy that need: Utilizing a second instrument to act on materials becomes possible and necessary at that instant when, inhibiting a socially mediated vital need,

²¹³Trần, *Ibid*, 39.

²¹⁴*Ibid*, 38.

²¹⁵Citing a 1967 article he penned, Tobias concludes, "*Australopithecus* was not the maker of the stone implements." Philip V. Tobias, *Olduvai Gorge, V. 4, The Skulls, Endocasts and Teeth of Homo Habilis* (2 tomes). Cambridge, 1991: 38 (Tome 1).

²¹⁶Trần, *Ibid*, 44-48.

preparation of that instrument is undertaken; in other words, as need itself is replaced by its ideal representation.²¹⁷ In this situation, it is the material itself, not need, which becomes the focal point in the sensory fields of the hominid, in holding and looking at the stone to be shaped with a view to the image ideally posited to guide work during the course of shaping the stone. Need requires its own suppression, its absence, with a view to what is also absent tactually and visibly (i.e., the image).

If formation of the instrument is carried pressure of compelling need, the typical shape is never produced. It is only when the immediate vital need has been satisfied and is not pressing, in other words, outside the situation of compelling need,²¹⁸ in "leisure" if you will, then the hominid otherwise engaged in play, grooming, etc., can re-present to itself, generate a simple representation of, the entire need situation itself (say by a glance at the remains of the carcass), that is to say, a representation of the need in relation to the hominid group can appear... Socially mediated all over again, the need, never strictly vital, it is a doubling of the sociality that has changed the situation, creating work, i.e., the production of the instrument by way of an instrument. With this to hand, our hominid, working on the stone entailing the use of a second instrument, has "gotten to work." It is in this practice (obviously over evolutionary time) that the hominid eliminates the natural shape and produces a distinct shape, and over evolutionary time, a *typical* shape.

Once typicality is established, this shape is something that can be regularly reproduced, produced on demand since it is guided by a distinct ideal image. But in producing such an image, the hominid is no longer merely itself, no longer the being it was the beginning of this evolutionary practice. The hominid has effectively remade itself: Having engaged in the creative "labor of production," it has become fully *Homo* (*Homo habilis*); yet engaged in a practice based and, in this sense (if such characterization is permissible), self-evolving self-development, a maker of instruments, not yet tools, a "man in the making" who will in the course of its total ensemble of practices inclusive of work become fully man.²¹⁹

Hominid Dispersal and Climate Change

We can further identify this moment of a self-evolving self-development with the appearance of *Homo erectus*, roughly 1,900,000 years ago. *Homo erectus* had a larger brain than its predecessor, limbs that were now fully adapted to an upright posture, and tools, tools that were created and improved over developmental time, and that were also superior, including a crude chopper, a simple flake knife, scraping tools, cleaving tools with sharp edges (for butchering large animals, digging up edible roots), and increasingly sophisticated hand axes. Again, *Homo erectus* populations were demographically denser, which, when the opportunity presented itself, led to dispersal. In this regard, hominids exhibited enormous existential propensities for geographical expansion...

There have been many, many large movements out of Africa, all by *Homo erectus* or (later) by archaic *Homo sapiens*, the earliest into Asia at about 1.8 million years ago, another at about 1.4 million years ago into the Levant, around 800,000 years ago, at 500,000 years ago into the Iberian Peninsula, at 350,000 years ago into the Levant, and between 100,000 and 90,000 years ago once more into the Levant... We know that three out of the four last major movements out of Africa have coincided with periods of warm climates just prior to or at the onset of new ice ages (beginning roughly 780,000, 335,000, 110,000 years ago), as, we suspect, may have been the case in all such large scale movements: Wetter, warm climates ended, drier, cooler conditions returned (with aridity and the expansion of the Saharan desert). During dry, cooler conditions, the only way out of sub-Saharan Africa was through the Nile valley, but it was precisely during these long glacial periods that the southern reaches of the Nile were dense swamp making movement down the Nile (northward) exceedingly difficult... In each case, hominids and humans may have, it appears likely in some cases, followed herds of mammals into more temperate latitudes during an interstadial or prior to the end of a warming or interglacial. (Down the Nile valley and into the Levant, the contemporary Middle East, is an obvious path of movement: At times over the past two million years, the Nile valley has been a lush area, with abundance of game. There is no environmental barrier between Africa and the Levant, as there is over the Mediterranean, which, even in colder, dryer climatic periods in which sea levels were lower, continental shelves were exposed and the size of its basin dramatically smaller, still presented a formidable obstacle.)²²⁰ What made even the earliest movements possible, especially to cooler regions of the Earth, had been the "discovery," i.e., the use, of fire perhaps at first simply as protection (especially

²¹⁷ *Ibid*, 39-43.

²¹⁸ *Ibid*, 45.

²¹⁹ *Ibid*, 46.

²²⁰ Fagan, *The Journey out of Eden*, *passim*.

at night) from predators, perhaps latter to burn vegetation in order to prey on animals fleeing the flames.

The Relation of Bipedalism to Material Culture (Tool Making)

In the concluding discussion to his massive multi-volume and comprehensive account and analysis of the hominid beings present at Olduvai Gorge (Olduvai 7), Philip Tobias poses a question of the de-linkage of upright posture to tool-making activities. While detaching one from the other does not have a material impact on our presentation of hominidization in relation to the hominid's own development, it is more problematic for Tr  n's.

Begin by recounting Tobias' reason for suggesting the geologically temporal dissociation. The reasons are threefold.

First, apes, it appears in accordance with recent studies, though not upright at least consistently or habitually, are nonetheless capable of an array of implemental activities. Thus, bipedalism is not the only anatomical activity that frees the hands for tool usage and tool making. Sitting upright may also lend itself to the same tasks.²²¹ These, of course, are *not* uses of tools in the sense of work.

Second, in a negative instance (that of one of the better evidenced and documented and also older australopithecines), while it is said the *Australopithecus africanus* went upright, there is no archaeological evidence that this species possessed a "material culture." If it made tools with bones as a medium (we do not think it did), it can be shown that carnivores of this southern African region could also had scraped, chewed and gnawed at bones in a fashion that would have produced features indistinguishable from those imputed to *A. africanus*.²²²

Third, there is a clear divergence in the dating of the respective onset of upright postures and tool making activities (even as bipedalism and tool making do at a certain point become intertwined). Fossil evidence suggests the earliest instances of upright posture may have become characteristic of certain australopithecines as long as 3.7 million years ago, whereas the earliest *Homo*, *Homo habilis*, dates from roughly 2.5 million years ago.²²³ In terms of the evolutionary development of *Homo*, a million years give or take a couple hundred thousand is an enormously significant stretch of time, such a stretch of time that it does not permit us to "causally" link the two activities.

While the disparity is importance for Tobias... largely, for him, because he adheres to the arbitrary anatomical determinism (modern science to which Tr  n too is contradictorily committed) of the paleoanthropological study of culture and behavior, and with it a unilinear causality... in the foregoing account what is truly significant is the centrality of the production of ideality. In this sense, it is only with hominids that we find instruments (tools) used in work; and in this work does depend as such on an evolutionary (not causal) linkage of upright posture and free hands to engage in tool making.²²⁴

²²¹Tobias, *Ibid*, 828-829.

²²²*Ibid*, 828-829.

²²³*Ibid*.

Brian Fagan (*Human Prehistory and the First Civilizations*. Lecture Series, 2003: Part I, Lecture 5), for one, has pushed this origin back to 2.9 million years ago.

²²⁴We should be clear that tool usage is not at question in primates.

In primate behavior, two primary forms of "tool" usage occur. Those forms are as an aspect of antagonist behavior and in obtaining food. The former is common in monkeys and apes. Animal intend is to ward off direct assault, and is an immediate function of fear and threat motivated action. Ronald Hall ("Tool-Using Performances as Indicators of Behavioral Adaptability" in Phyllis C. Jay (ed.), *Primates*, 145) summarizes and generally evaluates incidences of "tool" usage in animal life other than primates: He notes that it occurs in the course of animal evolution, in highly specialized situations and ecological settings, in courtship display and nest-hole construction and extending feeding habits (which is usually done with respect to a single food source), e.g., the solitary wasp holding a pebble in the mandible to pound dirt into a nest burrow or a Galapagos woodpecker-finch utilizing a twig as an extension of its beak to probe for insects or larvae. Characterized as behavior adaptations generated on the basis of trial and error, "...such performances are only worthy of special note because of their entirely superficial, indeed one might almost say fortuitous, resemblance to human tool-making." *Ibid.*, 131-148: 139, 146, 144.

Most importantly here, Hall indicates that it is not clear whether the behavior in question is species specific or simply due to local ecological conditions that invoke it. (*Ibid.*, 132).

A far more sophisticated tool usage suggestive of a high level of practical intelligence (see the Prologue, above) is found in captive elephants that, outfitted with a bell hung round their necks, use their trunks to plug the bell hollow up with soft mud or clay so that clappers cannot ring. They then proceed to "steel silently into grove of cultivated bananas at night" to eat (*Ibid.*, 141. Hall quotes here from a work by J.L. Williams entitled *Elephant Bill* (New York, 1950).

Further actions of this sort (by other species) include breaking off branches or heavy fruits and throwing them down in the direction of the intruder, dropping tranche, twigs, leaves, pebbles or even feces with a view to the position of the intruder, human ethological observers, or brandishing branches (*Ibid.*, 135, 136, 137, 146). Hall comments that it is probably the human (ethological) presence that elicits the behavior in the first place, *Ibid.*, 145; Hall, "Aggression in

*Critical Assessment of the Importance of the
Foregoing for an Anthropology of the Basic Forms of Human Socation*

The significance of the foregoing is multiple.

First, descriptively we have provided a reconstruction of humanity at its origins that is *de facto* counterposed to the reductionist accounts as undertaken in nearly all scientific archaeologies since the beginning of this discipline in the nineteenth century. A *non-reductionist* logic of forms of development of humanity is expressly presented here, one for which each "stage" of development once fully formed is no longer reducible, explicable or comprehensible in terms of the earlier one but has now established itself on the basis of itself and must be understood and explained in terms of itself. Social structure, bipedalism, tools, speech and consciousness all exhibit the character of *active self-development* in which *hominids make themselves* (literally anatomically, morphologically, physiologically) *by remaking* the conditions of their immediate life, extending to their immediate surroundings.

Second, in the sense of work (the labor of production) elaborated above, for which work entails activity on other objects by way of instruments, we state something essentially about the anthropology of archaic communities understood as a basic form of human socation. It is the following: Plucking fruit from a tree, gathering seeds from plants, picking berries, are in this sense not work. The determination of archaic communities from the simultaneous absence of labor and a state permits us to firmly grasp the necessary, historical connection between labor, the state and social stratification.²²⁵

Third, our description of the origins of consciousness in the interaction and speech of early *Homo* and our account of the genesis of ideality in work reproduces, once again in entirely unintended fashion, a tacit critique of Marxism of a historically significant sort that is explicit elsewhere:²²⁶ Speech and work appear as autonomous activities, neither reducible to the other, yet related since the development of each necessarily occurs in conjunction with the other. They are also premised on while, dialectically, deepening social subjectivity. (In science, this would be regarded as entailing a bigger brain and, on its physicalistic assumptions, as causality upside down.) With regard to Marx (and in contradictory fashion, Trần also), the assumption that labor (work) is the decisive determinant in the formation of "man" simply does not hold, and cannot be maintained on the basis of first, a detailed, exacting reconstruction of consciousness at its (hominid) origins and, second, evidentially grounded analysis of stateless (archaic) human communities without labor, production or an economy, an analysis we have undertake elsewhere.²²⁷

In point of fact, various forms and practices were at once requisite (necessary) and present in the self-making of man. These included bipedalism, speech, work and instruments (tools), as well as sociality (others) and social organization. Moreover, they were present within or without the context of environmental resource shortages (which is the Darwinian explanation), rapid climatic transformations or intervention of cosmic forces (which are contemporary explanations), etc. All these forms and practices were *simultaneous* and *recurrent* developments. It is for this reason that we do not privilege work, whose role may or may not otherwise be unique.

Fourth, for Trần it is hunting as a central being-defining practice (cynegetization) that connects work (the fashioning of tools), ideality (as the creation of non-sensuous, aspatial typical shape) and speech (the articulation of sound in the activity of hunting itself) together. As we have argued, contrary to Trần, hunting was not the decisive feature generating hominidization: In point of fact, a condition of scavenging itself in open areas where the possibility of being spotted by a predator (e.g., the evolutionary ancestors to hyenas, lions, eagles, etc.) was greatest²²⁸ would have been the ability to rapidly dispose of the

Money and Ape Societies," 150). In the former case, it is a question of gathering food that is otherwise not available, that is out of reach. It is behavior exhibited in captivity and as a rule only as a supplementarily in food consumption. As we have described it, tool usage in the process of hominidization is a function of work as reconstructed above. None of primate activity involves work.

²²⁵This is fully elaborated in *Archaism, Agriculture and Power: Hierarchy, Social Division and Natural Determinism* (St. Paul, 2009, 2011): "Power and Agriculture" and "Non-Capitalist, Human Communities (Forms of Socation) and Earthly Nature."

²²⁶But rarely.

Most forcefully, see Jürgen Habermas, *Knowledge and Human Interests*. Boston, 1972: passim, but especially in his discussion of "material synthesis" in chapter 2, "Marx's Metacritique of Hegel."

²²⁷See the penultimate footnote, above.

²²⁸We might recall that the Taung child (i.e., the model-type for the taxonomic designation *Australopithecus africanus*) was taken by an eagle or its evolutionary equivalent. L.R. Berger and R.J. Clarke, "Eagle Involvement of the Taung Child Fauna," *Journal of Human Evolution*, 29 (1995): 275-299.

carcass, to quickly strip muscle from bone. This means it would have been necessary to cut tendons, either that or engage in a time consuming, "inefficient" and dangerous practice of tearing the meat away. Thus, some form edge shaped tool would have become necessary without ever engaging in systematic hunting.²²⁹

Fifth, while accepting that fully intelligible meaning is contextualized, thus requires sentences, as its origins language may not have expressed meaning at all. Here *context* would have meant something different: Sounds would have been perceptually immediate in the strict sense, largely understood by the gestures and intonation that framed them. They may have referred to an object, the deer, in which case meaning is implied, tacitly of course and sensuously enveloped; but they may have expressed an emotional state, say a longing ("come here, close to me") in which case there is no possibility that the sound could have indicated, or "corresponded to," an object (again, the deer), and would have entailed an implied (reciprocating) action. Such correspondence would have been only one modality of spoken language at its origins (for at its origins language was speech); and, to boot, in the various, diverse states, intents, etc., that a speaker would have expressed, we would have had just the sound... modulated, inflected... to convey the state, intent, etc., altogether absent an one-to-one relation of word to object (which at any rate is merely the empirical, atomized case and is rarely the manner in which meaning is conveyed), so that, for instance, even now one says "yo" and means and intents, "you, come here"; or, in the deep past, one said "ahaaah," pointed and intended "above, the eagle" which immediately urges and requires activity, seeking cover.

Sixth, the premise is that others are present. If in all other ways we as humans have, in this specific respect we have not departed from primate behavior of foraging: Socially reproductive activities (e.g., foraging, scavenging, hunting) are done *in groups*, some activities by individuals and others in a manner in which the group itself is primary, but there are no Robinson Crusoes here.²³⁰ The band may be somewhat dispersed over a smaller or large field of activity, so that a member or members find a carcass that has not been entirely picked clean, or perhaps a real find in a recently deceased large herbivore trapped in bog that has not yet been spotted by other scavengers. Getting it out, gutting it, stripping its flesh will require many hands. This prospect invokes a cry, perhaps a bird sound, that alerts others to come to one's aid. Sounds of this sort would have been used constantly. They would have become regularized. Accordingly, if not entirely decontextualized, they could nonetheless have been transposed to other contexts. For example, they could have been the basis for song in dancing that, functionally and socially, reinforced and heightened group unity. This is a development in language generated by a collective presence itself, which, considered anatomically, in turn would have led to, demanding, an enlargement of that organ we call the brain (encephalization, but understood as the organic "substrate" of a being active in nature, not physicalistically and not causally) that, in its turn, would have produced the possibility, enhancing the chances, of further development in communicative speech. These are not linear events; they are circular, the causation is dialectical...

Let's summarize: In the development of hominids, hominidization, "causality" in the sense of active premises is circular, not unilinear: New activities, new tools gave rise to new skills that, simultaneously, presupposed and were the premise of the precognitive constitution of a more and more tightly integrated, unified perceptual field. In turn, all presupposed and premised an indicative, performative speech that was laboriously elaborated: Beginning, perhaps, with the reproduction of animal sounds as lures or distractions, followed by gestures (in its developed form, pointing) that are akin to signals and, accompanying these, their reproduction in audible form. Thus, an extremely limited vocabulary rooted in and "clarifying" aspects of, say, the hunt or in scavenging or gathering, and in ritualized activities perhaps ceremonies, was thereafter utilized, if necessary, in planning details. This clarification was achieved by way of gesture: In the basic situation, it is a matter of the circular arc that has the lagger or one beyond the periphery indicate herself in gestural movement from the group to self. In more developed form what

²²⁹The whole issue of the primacy of hunting (and thus meat eating) versus scavenging (which would, then, have been subordinated to foraging and collecting or gathering) is an "old" anthropological and archaeological debate. One highpoint in the discussion can be found by beginning with Lewis Binford, *Bones: Ancient Men and Modern Myths* (New York, 1961); following lengthy fieldwork, a riposte by Henry T. Bunn and E.M. Kroll, "Systematic Butchery by Plio-Pleistocene Hominids at Olduvai Gorge," *Current Anthropology*, 27 (1986): 431-445; and, concluding with Binford's rejoinder, "Comment on 'Systematic Butchery by Plio-Pleistocene Hominids at Olduvai Gorge,'" *Current Anthropology*, 27 (1986): 444-446.

²³⁰In the bourgeois era, this may be difficult to grasp. An example:

If Peter, Paul and I are moving belongings into a new apartment and we have a very large, very heavy round table to move, we situate ourselves around it. Someone says, "one, two, three, lift," and we lift the table. Does Peter, Paul or do I lift the table? Obviously, none of us alone does. We lift the table. *The subject of the action is collective.*

is grasped, the "thing" aimed at is initially recognized indicatively, in pointing to the prey, say a deer, as in 'there.' Saying "there" and pointing does not yet create ideality, words embodying meaning distinct from their referents (where that meaning is intersubjective, non-spatial and non-sensuous), meaning has not yet risen from the thing indicated; or, better, it is meaning, ideality, but only as sensuously shrouded, undetached and not yet separable: The recognition is totally contextual, immersed, for instance, in scavenging or gathering or hunting or ritualized behavior (dance accompanied by chant, latter song), and thus bounded by practical social subjectivity of those so engaged; it is, as it were, primordial meaning, ideality at its origins, *ur-ideality*.

Such highly circumscribed, immediate social and practical speech led, then, to the constitution of perceptual objects in their objectivity as objects distinct from motor-sensory activity. Simultaneously through this integrated complex of activities, it generated consciousness... which is precognitive intentionality, a temporal stream of experience in which an object other than itself to which it intends together with it itself are simultaneously present or directly disclosed;²³¹ in other words, precognitive awareness of itself as it grasps the object as other than and distinct from itself. It is a temporal flow of experience through formation of a field of awareness in which figure and ground are inseparably distinct and other: Awareness of itself is a background against which the object stands out as foreground, as separate and other (not immanent to), "transcending" itself... This consciousness is neither self-consciousness (it is not the ego or the "I," an outcome of a lengthy development still to unfold), nor simple animal sentiment of self for which the object is not detached from sensory-motor awareness and for which the object exists indistinctly, only within the field of drives and affects. The content of this primitive consciousness is still anonymous, the unity of self and others in various activities that intend an object and is unified, constituted, through this practical intentionality. *This is consciousness at its origins* which, in this entire long history of self-making that produces "man," once constituted is irreducible. The perspective we have now achieved demands we engage in a philosophical reflection drawing out the transcendent significance of the preceding analyses.

*The Constitution of Spirit within Nature*²³²

Having set ourselves, and executed, two distinct yet intertwined if not inseparable tasks in the foregoing... to exhibit that society is situated in nature, and to demonstrate that its structure, particularly its manifest structure of hierarchy and inequality, is formed and not simply pregiven... it is patent, obviously manifest, that we consciously operate in a tradition that is historical, materialist and dialectical, that, in other words, we deploy a materialist reading of Hegel.

It would, then, be remiss on our part if we did not engage Hegel with a critique of his great shortcoming, the failure to locate the origins of Spirit within Nature itself. We are required to set ourselves this course precisely because we have located the origins of man, bearer of fully developed Spirit, in Nature...

As philosophy in the strictly Hegelian sense, i.e., as a coherent speech about the whole, the totality of what is as an integrated, structured whole, the materialist reading of Hegel is carried out and only achieved *against Hegel*. For the whole includes nature as its encompassing context and, simultaneously, as a decisive moment. Yet for Hegel, nature is pure externality, fully other than and counterposed to Spirit (*Geist*), a mere deficient mode of the being of its becoming, but contradictorily so (and not in the dialectical sense) because there is no becoming in nature that out of its own movement generates the Idea (Spirit). "Nature has presented itself as the Idea in the form of otherness. Since in nature the Idea is as the negative of itself or is external to itself nature is not merely external in relation to this Idea, but the externality constitutes the determination in which nature as nature exists"²³³ (our translation, emphases in

²³¹I.e., the object is neither passively given, as sensation, and transmitted from an anatomical organ (the eye) by nerve fiber to a specific cortical region, nor is it a reconstruction from, e.g., "sense data."

²³²The constitution of Spirit (i.e., its appearance and formation within nature) is not its phenomenology, while its phenomenology is its logic: The latter is merely the retrospective articulation of the categorical structure of that movement, the connectedness and relatedness of those phases, stages and forms that constitute this movement. A phenomenology, then, is not a simple prequel, no mere propaedeutic. It contains within itself all the material which Spirit can in its reflexive leisure, as it were, reconstitute the categorical determinants arising from its movement. A phenomenology in this sense completes itself as onto-logos, in a speech about the whole, that speech, while the tracing out of its logic, not quite an afterthought, is a postscript.

²³³"Die Nature hat sich als die Idea in der Form des *Andersseins* ergeben. Da die *Idee* so also das Negative ihrer selbst oder *sich äußerlich* ist, so ist die Natu nicht äußerlich nur relative gegen diese Idee (und gegen die subjektive Existenz derselben, den Geist), sondern die *Äußerlichkeit* macht die Bestimmung aus, in welcher sie als Nature ist." G.F.W Hegel, *Enzyklopädie der philosophischen Wissenschaften im Grundrisse. Zweiter Teil. Die Naturphilosophie. Werke* 9. Frankfurt am Main (Suhrkamp), 1986 (1830): §247.

original).

All relations within nature are indifferent because external to one another, and nature exhibits no striving, no inward impulse (transcendence); rather, it merely subsists and cannot give birth to novelty.²³⁴ "In this externality the determinations of the concept have the appearance of an *indifferent subsistence* and isolation in regards to each other. The concept therefore exists as an inward entity. Hence nature exhibits no freedom in its existence, but only *necessity and contingency*"²³⁵ (our translation, emphases in original). One can legitimately wonder how nature can in any sense be said to be Spirit "in the form of otherness."

Neither dialectical nor coherent, i.e., un-philosophical, there is sense in this nonetheless. But it is the sense of the bourgeoisie. For *this* "philosophy of nature" is merely a theoretical restatement of the assumptions that are present in the modern science of nature. It *reflectively, as in the unmediated understanding turning back on itself*, recounts the self-contained atomism of modern mechanics (bourgeois theory *par excellence*), which is society projected onto nature²³⁶ and articulates a conceptual mediation (nature domination) of bourgeois practices (capital accumulation) in the service of the objective historical task of expansion of productive forces.

Thus, Hegel merely reproduces the structural division of the aggregate of bourgeois sciences (all epistemological and methodologically modeled on that mechanics) as they existed in his time: "The idea as nature is:

"I. determined as universal *externality*, which, endlessly, is extension [space], outside which is the unity of form, thus [its unity is] as ideal, only in itself... This is *matter* and its ideal system, *mechanics*;

"II. determined as particularity, so that its reality is posited as indwelling form existing indifferent to itself. This externally reflexive relation is *individuality* - in nature, *physics* [,]" i.e., mechanistic biology;

"III. determination as *subjectivity*, in which the self-differentiation of form is likewise *ideal* unity, which finds itself for itself in turning back on itself. This is *organics*,"²³⁷ i.e., a naturalist psychology (our translation, emphases in original).

This is bourgeois theory reflecting on its own immediacy, but never raising itself above, never mediating itself with itself and, in so doing, going beyond itself.

For a historical, materialist and dialectical theory that seeks to integrate society and nature and society into nature, as otherness within sameness, a different perspective on nature is both necessary and possible:

If, in the materialist reading of Hegel, Spirit is not completely other and external to nature, it is because *one of the outcomes of the whole atemporal becoming of nature has been nature becoming Spirit*. This is, however, only possible if nature itself develops, and in this movement gives rise to new forms of being: This self-development of nature is driven by a negativity that, intrinsic to it, in its productivity generates novel orders, levels, or manifolds of being, each establishing its autonomy (i.e., its own

²³⁴"Die Natur ist als ein *System von Stufen* zu betrachten, deren eine aus der andern notwendig hervorgeht und die nächste Wahrheit derjenigen ist, aus welcher sie resultiert, aber nicht so, daß die eine aus der andern *natürlich* erzeugt würde, sondern in der inneren, den Grund der Natur ausmachenden Idee" ("Nature is to be regarded as a *system of stages*, in which one stage necessarily rises to the other and is the truth of the other closest to that from which it results, though not in such a way the one would *naturally* generate the other, but to the contrary as the inner Idea constituting the ground of nature." Our translation, emphases in original) *Ibid*, §249.

²³⁵"In dieser Äußerlichkeit haben die Begriffsbestimmungen den Schein eines gleichgültigen Bestehens und der Vereinzelung gegeneinander; der Begriff ist deswegen als Innerliches. Die Natur zeigt daher in ihrem Dasein keine Freiheit, sondern Notwendigkeit und Zufälligkeit. *Ibid*, §248.

²³⁶In the struggle against Peripatetic natural philosophy early modern scientific thinkers formulated a vision in which the world is "viewed as an open, infinite, and internally unstructured universe (whose fundamental elements consisted of perceptually inaccessible, internally unrelated, and indivisible particles)," one which "mirrored a bourgeois society in the process of formation; that is, it transposed into, at once concealing and mediately expressing in, thought the structure and organization of a world of isolated because privatized and egoistic individuals confronting an incomprehensible other (society) that was coming to be *unconsciously organized around exchange, transforming social relations into a bellum omnium in omnes*." *The Critique of Science*, the Introduction, "Elements of the Conceptual Structure of Science, below.

²³⁷"Die Idee als Natur ist:

"I. in der Bestimmung des Außereinander, der unendlichen Vereinzelung, außerhalb welcher die Einheit der Form, diese daher als eine ideelle... die *Materie* und deren ideelles System, - *Mechanik*;

"II. in der Bestimmung der *Besonderheit*, so daß die Realität mit immanenter Formbestimmtheit und an ihr existierender Differenz gesetzt ist, ein Reflexionsverhältnis, dessen Insichsein die natürliche *Individualität* ist, - Physik;

"III. in der Bestimmung der *Subjektivität*, in welcher die realen Unterschiede der Form ebenso zur *ideellen* Einheit, die sich selbst gefunden und für sich ist, zurückgebracht sind, - *Organik*..." *Die Naturphilosophie*, §252.

organization and structure) on the basis of a heteronomous relation to the "lower" order, each in its own contradictory development preparing the conditions for formation of a novel, "higher" order, in the grossest sense those orders being abiotic, vital and human.

Nature is infinite productivity, *natura naturans*. This restless movement and dynamism are never experientially given and cannot be empirically constructed; it is a latency which is at once nature's sole substrate and the final source of its movement, non-objective and non-mechanical. As such, nature is only to be regarded in its unending (endless) *becoming* as that which is not yet achieved, as negativity, latency and driving disposition operative in each moment. This negativity in nature *repeats itself endlessly*, for its movement is never a straight line abandoning itself once a new order of self-organization has been achieved, but affirms itself in its countless reiterations and recurrences as *new structure, new organization, and new forms appear*.

It is, however, only the sweep and movement of nature as a whole which, for us cognitively, reveals that these moments (either as single products or as new structure, organization and form) mutually support one another and are not isolated. The complex chain of mediations may appear as a chaotic concatenation of events and processes, but is the consequence of the total situation of the "system" (and thus is connected to the first condition of nature, *natura naturans*) at that moment and "place" where any given moment, or limited product (*natura naturata*), first appears.²³⁸

The standpoint from the foregoing is articulated, as well as the epistemological justification it supports, cannot, to be sure, derived from the modern science of nature, not even from Hegel; to the contrary, it is necessary to go back to Schelling to epistemologically frame it (the perspective from which this standpoint has been achieved): This movement we have termed negativity, latency and driving disposition, "sie kann also nur als *Act* vorgestellt werden, als *absolute Synthesis*, welche nur ideell ist, und gleichsam den Wendepunkt der Transcendental, und der Naturphilosophie bezeichnet";²³⁹ and while we certainly would not refer to our standpoint as "transcendental" (laden as it is with connotations of an idealist theory of consciousness), in our language *it is a standpoint from which we have ideally reconstructed the entire becoming of nature as movement forming the conditions that, lacking any human presence, constitute the premises on which humanity as a form of being in nature existentially depends. It is a standpoint which has been achieved to the extent that we are poised at the end of two converging epochs in human and Earth history, one that dates from the origins of agriculture, the formation of a sphere of production distinguished by fixed positions within it and the emergence of the state, and the other a two million year old, geological cold mode (ice age) in Earth history. It is precisely because the end of this vast historical-geological epoch presages a mass species extinction (which would entail the objective possibility of the disappearance of humanity) that a privileged anthropological-evolutionary perspective has formed. It permits us to reconstruct that development which, before Spirit has ever appeared, reaches back into vital and abiotic nature all the way to their evolutionary-cosmological presuppositions*.²⁴⁰

With respect to the appearance of Spirit, the negativity operative in all natural movement begets novelty, from the invisible (called atoms in various traditions of science and philosophy) as they constitute themselves into a new irreducible order of inorganic phenomena, molecules so-called, to the initial production, repeated endlessly, of organic molecules from inorganic ones. (Over the endless becoming

²³⁸The opposition of the speculative, ideal reconstruction of earlier nature as a premise of our thinking and the alleged "empiricism" of physical science is to be found in science that sets out from the limited thing in isolation and a becoming that is unconditioned and never fully manifested. Similarly, Schelling states, Der "Unterschied der speculativen Physik von der so genannten empirischen... sich hauptsächlich darauf reducirt, daß jene einzig und allein mit den ursprünglichen Bewegungursachen in der Natur, also allein mit den dynamischen Erscheinungen, diese dagegen, weil sie nie auf einen letzten Bewegungs Quell in der Natur kommt, nur mit den secundärin Bewegungen und selbst mit den ursprünglichen nur als mechanischen (also auch der mathematischen Konstruktion fähigen) sich beschäftigt..." [The "difference between speculative physics and empirical physics so-called... largely reduces itself to this, that the former concerns itself singularly and entirely with the original source of movement in nature, that is, solely with dynamic phenomena; in contrast the latter occupies itself only with the secondary motions inasmuch as it never reaches a final source of movement in nature, and even with what is original only as mechanical (and therefore also capable of mathematical construction)."] F.W.J. Schelling, *Erster Entwurf eines Systems der Naturphilosophie. Zum Behuf seiner Vorlesungen*. Jena und Leipzig, 1799: 7.

²³⁹"It can only be represented as an idea *act*, as *absolute synthesis*, and simultaneously designates the point at which transcendental philosophy becomes the philosophy of nature" (our translation). *Ibid*, 321.

²⁴⁰Simply stated here, the epistemological justification for this position is elaborated in the Introduction, "What is at Issue in the Examination and Analysis of Human Origins," while the standpoint supporting that justification was initially laid out in the opening remarks to this work, and is fully elaborated (i.e., the social and historically conditions that render this standpoint possible, necessary and real) in *Capitalism and the Domination of Nature*, "Capitalist Criminality."

of nature, this negativity also begets new orders of reality that rise to visible and tangible objects as gases, dust, rock, planets, stars, solar systems and galaxies.)

At the moment that organic molecular self-organization and reorganization results in the initial synthesis of primitive life, the foundation on which Spirit will eventually subsist has emerged as a novel reality. As soon as this reality, the most primordial prokaryotic forms, the first component in the assemblage that will constitute the full conditions for the appearance of Spirit has also formed: It is a movement characteristic of life itself, the double movement of inside to outside and outside to inside that is constitutive of the autonomy (which itself is the capacity to self-generate something new in the world, something which was not previously present) that this double movement defines...

This double movement will be basic "model" of the manner in which over historical time Spirit as a later development becomes aware of itself, i.e., a going outside of itself in order to return to itself, i.e., it is the way in which man as Spirit forms herself: The movement from inside to outside and outside to inside, this double movement which begets synthesis, is at once *activity*, a process and continuous practice of self-formation (what Marx for one calls *objectification*), and *expression*, the outer manifestation of inwardness,* a confirmation and affirmation of the latter which in revealing clarifies itself. Activity and expression are ontologically inseparable yet distinct and necessary in man as Spirit. (Dance and song, for instance, are primordial forms of human expressivity.)...

As life appears in its increasing complexity, in every newly appearing level of the Real (nature), this life is integrated by way of the establishment of its autonomy on the very basis of that dependency, that being-in nature which situates it therein. For constituted in this double movement, synthesis is essentially life, i.e., the activity in and through which it independently reproduces itself as such. In the case of the bacterium for instance, take the assimilation of an inorganic molecule: It transforms, synthesizes, that inorganic substance into an organic one thereby incorporating it into itself and in this process, it excretes whatever is the inessential outcome (waste) of this elementary biological activity. This synthesis, this productivity, is a manifestation of the presence in life, and in life as part of nature as self-transcending negativity. This is the essential core we have called *natura naturans*.

As the forms of vital existence rise from primordial metabolism through drive or impulse, behavior in its instinctual and its habitual forms, to practical intelligence, the latter three of which presuppose incarnate mobility and which we characterize in terms of animal sentiment of self (consciousness tacitly conscious of itself as itself but oriented to a surrounding milieu that is experienced as tugs and pulls which are actually drive and affect determined), we see, first, the emergence of personality and, then, (later in practical intelligence) the increasing formation of individual behavior that is distinct from species behavior.

We can, as we did in the Preface above, trace out this process of formation of distinct forms of life. In nuce, they constitute the full conditions for the appearance of Spirit, and retrospectively, for us, appear in the *atemporal becoming that is nature as the development of Spirit* itself, a movement which situates it, Spirit, ever after within, not opposed to, nature.

This development as a whole and in each and all of its moments (phases and stages) is holistic and teleological (i.e., oriented toward a goal), and in this orientation that goal is maintenance and enhancement of itself, totality and moment; it is in other words self-development. Whether primordial metabolism (the double movement of inside to out, and outside to in), impulse (vital feeling in elementary plants), instinct, habitual behavior (associate memory), practical intelligence, and whether the various shapes of (non-extant) conscious life forms (hominids, species in the genus *Homo*) that went beyond animal sentiment of itself and immediately preceded the appearance of man and in which Spirit is present to itself (though in most cases not explicitly), in each and all of the moments this development is also bodily movement which is not only distinguished from the abiotic nature it is moored in, but makes possible a relative detachment from that nature. The plant, for instance, is not rigidly fixed in the soil but is capable of orienting itself *in situ* to light, and closing upon itself in darkness or cold; the animal is capable of moving about its environment (*Umwelt*). First orientation then motility, thus embodiment is crucial to the development of Spirit, it's becoming: Detachment does not mean free floating, above or other than nature but incarnation, a material-sensuous or bodily rootedness in nature, for *without embodiment there can be no development of Spirit*, its realization would be impossible. What it does, in part, mean is an increasing liberation from the immediate pressures of life and existence that is only fully realized in man. (I.e., only with the appearance of man in nature is there a being that can consciously make an object for itself, objectify, any and all of its emotive, physiological and cognitive states and processes).

Here we must anticipate.²⁴¹

With the appearance of man in nature, Spirit achieves new forms of its self-elaboration. Established in the hominid and *Homo's* work, labor and activity, the constitution of these forms include the existential liberation from immediate pressures of life, the production of concepts and intuitions of essences where they differ, discursive rationality, a complex of emotive acts (above all, love) already tacit in animal existence and in and through all of these the production of a *world*, an integrated totality of objectified and materialized activity constituted in material-sensuous structures (dwelling, architectural forms, infrastructure of all sorts), use and cultural objects in material-sensuous form, aspatial and ideal objects (concepts, theories), and social relations and institutions of daily life. This existential liberation means that "man" does not relate to a specific environment (which after her appearance is at any rate a humanly formed natural milieu), to an environment at all, but to a world that rests in and on the atemporal becoming of nature, cosmologically developing natural being in one of its aspects, on the Earth.

Of course, man never appears as such; it is men and women who have become and are bearers of Spirit, are Spirit itself. It is only in their (our) cooperative interaction in and on the basis of daily life that this world appears, is produced, is brought forth as something new that in the very process of becoming, in this temporality called history (the temporal medium in which Spirit becomes transparent to itself, conscious of its own development, aware of itself): That world is essentially and fundamentally social in its constitution, its formation, its structure and organization.

In man, Spirit reconstitutes all over again its basic movement, going outside of itself in order to return to itself, for in man too this is this practice in which becoming unfolds: In the various forms of practice, work and labor and activity, a world is constructed and the "man" herself (men and women) are realized, formed.

It is in this process (practice) of self-development which is a self-realization, that, because Spirit must go out of itself in order to return to itself (and in the whole process realizes itself in the endless atemporal becoming of nature), Spirit divides itself, finds itself objectified and materialized (and thus is able to recognize, re-cognize itself), in various forms of this, its, development. We acknowledge two forms of objectified Spirit, those that rise from congealed social relations (i.e., they are institutional), Objective Spirit; and those that are self-consciously re-cognizing (art, philosophy, mythology and religion), Absolute Spirit. We can elaborate:

The movement of Spirit as human practice creates social relations as abiding regularities within the movement; reproduced in that practice over and again, these social relations congeal as institutions, call this Objective Spirit. The forms of Objective Spirit are varied and numerous, and that movement (contrary to Hegel) does not favor the creation of any specific set of forms (institutions, such as, for instance, civil administration in the state, the state itself, law or a reified relations congealed in an "economy," all of which all are forms of alienated negativity, forms of necessity, natural determination and unfreedom which Spirit, man, has yet to unmake.) Yet underlying both (Objective and Absolute Spirit) we recognize a more fundamental form, those tacit shapes of self-conscious existence incarnated as custom, as moral sentiment, that is, as a collective sense of propriety, moral imperatives, loyalties, sanctions and taboos, and expectations, the totality of which, the individuals who are their bearers and the social life in which they are embedded, constitute "community" or in this aformal and fully materialist sense, popular Spirit... In all this, the fullest realization of Spirit is only possible as a transparency to itself, a transparency that is confirmed and affirmed institutionally as objective (Spirit) *and* in the image that Spirit gives back to itself as Absolute (Spirit)...

We can now turn to the task of locating precisely where, at what moment, fully developed Spirit, or if you prefer man as man (modern man) bearer of Spirit, first appeared.

Part VI Neanderthals and Modern Man

In the taxonomic sense, Neanderthals and modern men belong not just to the same genus but, as subspecies, to the same species. Are they different in other than anatomical and morphological ways? Among those who would counterpose man to nature as a unique being who, once she appears in nature, departs so radically from it (by virtue of history, society and history, culture, whatever) that, for them, humanity is not in any recognizable manner subject to natural determinism, the answer is a resounding "yes." But it is a mere premise, unreflected and unassessed.²⁴²

²⁴¹For the following in greater detail, see *The Appearance of "Spirit,"* below.

²⁴²See the Introduction, above.

Of course, for those who undifferentiatedly incorporate humanity into nature (so that she is subject to all natural law, to

We shall suggest something quite different. Man distinguishes herself from all hominids, even those most kin to her (i.e., Neanderthals), all the while remaining part of nature, in nature and of nature, nature.

Neanderthals and the Origins of Modern Man

Let's restate the issue briefly touched on in the remarks immediately above: The determination of what it means to be human, "man," in an essential sense as it appears in the literature of paleoanthropology and archaeology and, just as importantly, as it guides the archaeological practices of those actually engaged on the ground (in the ground would, to be sure, be the more adequate expression), is anatomical. At her origins, man (i.e., humanity) is *Homo sapiens sapiens*. Man is man because of a suite of features, cranial capacity, dentition and jaw, the position of the foramen magnum, etc.²⁴³ The anatomical designation is important not just because it determines a certain physicalistically based morphology that constitutes the criterion determining the humanity of man as a being in nature: It is important because it is part of the problem and not an element in resolution of the problematic.

Let's start with the problematic.

This, the latter, is a question of distinguishing the appearance of *Homo sapiens sapiens*, first, from the other sapiens, *Homo sapiens neanderthalensis* (and we suspect others too, also no longer extant), then from other species (*habilis*, *erectus*) within the genus *Homo*, all of which are extinct hominid species. Most broadly, it is a question of distinguishing humanity from all other forms of animal life within the general horizon of nature.

By and large, answers to this question come in two forms, both of which constitute determinations of humanity's place in nature, one which understands that relation in terms of continuity largely absent a qualitative break, the other that effectively denies there is a relation at all. There are a number of nuanced positions that seek to mediate these two forms, all of which are subject to the same overall incoherency as the dominant explanations...

The recourse to anatomical criteria situates that explanation within the mode of thought that seeks to understand man in terms of continuity... within various species of *Homo*, from later hominids moving backwards in evolutionary time to earlier hominids including australopithecines, from australopithecines to ancient great apes, hence from man to ancient primate species.

This brings us to the problem.

In evolutionary theorizations, humanity at its origins is described in terms of certain features that characterize it in contradistinction to other similar and different (e.g., hominid and primate) forms of life.

So that, for example, dentition and the size of the jaw, bipedalism, and an enlarged cranial capacity and, only on this basis, the development and use of language are said to adequately describe man as man. But on entirely and explicitly justified non-scientific premises, as we have shown above, anatomical evolution did not precede social (cultural) and technical development, it did not drive species development, and the "transition from animality to humanity" was not a linear process. It is impossible to specify speciation within the genus *Homo* strictly on the basis of anatomical evidence. Awareness of the problem is often acute,²⁴⁴ but as long as the physicalist premises of the modern science of nature are taken methodologically and evidentially as a model, the problem cannot be resolved.

We can offer resolution by working through a work that highlight this *aporia*, and thereby by developing it as far as the framework of modern science of nature permits, exhibiting its limitations, contradictions and the impasse it creates for itself, and doing precisely in an explicit effort to bring out the fundamental differences between Neanderthals and modern man. In so doing, we establish the framework for exhibiting man as *a being in nature* organized on basis of novel principles specific to a novel order of reality (nature) which her very being defines.

That work in question is David Lewis-Williams' *The Mind in the Cave*.²⁴⁵

What is unique and without doubt contradictory in Lewis-Williams is that he seeks an explanation of the "physical" laws of the universe, etc.), the answer is an emphatic "no." This is the modern science of nature or those who articulate it, its bearers, simultaneously personifications of capital. This is also a mere assumption, it too unreflected and unassessed. See, again, *The Critique of Science*, Third Study, Part III, "The Materialist Dialectic."

²⁴³Two anatomical features which do distinguish Neanderthals from modern men are an asymmetrical sigmoid notch and a horizontal-oval mandibular foramen. V. H. Stefan and Eric Trinkaus, "Discrete Trait and Dental Morphometric Affinities of the Tabun 2 Mandible," *Journal of Human Evolution*, 34 (1998): 443-468.

The foramen magnum is the opening in the skull through which the spinal cord passes to the brain stem.

²⁴⁴For example, see the previously mentioned work of a major archaeological figure since the 1970s, Philip Tobias, *Olduvai Gorge, V. 4. The Skulls, Endocasts and Teeth of Homo Habilis*. Chapter IX.3, F2, and the discussion of Tobias above.

²⁴⁵David Lewis-Williams, *The Mind in the Cave: Consciousness and the Origins of Art*. London, 2002.

modern man (as distinct from all other forms of *Homo*) within the framework of a physicalist, specifically physiological or neurophysiological, account of man that as scientific denies this specificity. Committed to the modern science of nature as the ultimate framework of understanding and the achievement of valid knowledge, yet alive to the transcendent significance of cave art (in our terms an objectified expression of *Spirit*) for the human beings who produced it, Lewis-Williams pursues an impossible, hence failed, synthesis of an explanation of irreducible phenomena within a radically reductionist form of understanding.

The understanding of the significance of "cave art" poses this problem of the specific character of man as man or, more to the point of modern man or human modernity, of humanity as it is conventionally understood. Neatly dovetailing with our problematic, in Lewis-Williams the ensuing discussion takes the form of counterposing the respective species specificities of Neanderthals (*Homo sapiens neanderthalensis*) and humans (*Homo sapiens sapiens*) within the genus *Homo* and within the context of an account of the further problematic of what is known as the "Middle to Upper Paleolithic transition."

Conventionally, the Middle Paleolithic forms the entire period from approximately 250,000 to 45,000 years ago, the Upper Paleolithic from approximately 45,000 down to 10,000 years ago. The Middle Paleolithic is said to be characterized by a material culture that is Mousterian (and at its end, Châtelperronian), the Upper Paleolithic by a well-defined material cultural sequence that is consecutively Aurignacian, Solutrean, Gravettian and Magdalenian.²⁴⁶ (As is altogether typical in archaeological denominations, the period names are derived from site locations where artifacts were in some recognizable but rather undefined quantity originally found. These sites constituting the Upper Paleolithic sequence, it should be noted, are all western European.)

The Mousterian is said to be the material culture of Neanderthals, the Aurignacian that of the first modern humans in Europe, Cro-Magnons... It should be remembered that all of the communities of these peoples, regardless of whether they were Neanderthal or Aurignacian, were nomadic and hunter-gatherers... During the Upper Paleolithic transition (say from 45,000 down to 35,000,²⁴⁷ about 5,000 years before Neanderthals effectively became extinct as a (sub)species of *Homo*, itself a period in which Neanderthals adopted certain features and forms of the material culture of modern humans), the material cultures of the Neanderthals and modern human, like the two (sub)species themselves, co-existed more or less side by side in western Europe. (Neanderthals ranged the frozen, glacial world of Europe and Eurasia as far east as the Black Sea from roughly 250,000 to 30,000 years ago) ...

The typology here, that is its rigid form, cannot be upheld;²⁴⁸ There is here a completely uncritical, entirely assumed one to one correspondence that necessarily relates physical type to cultural type. In point of fact, the linkage of anatomy to behavior, especially as regards modern man, is hardly necessary: In the archaeological record, it has never been demonstrated to be either universal or exclusive²⁴⁹ and, we would add, based upon Levant and Middle Eastern "sequences" its non-universality and perhaps its convolutedly constructed character is on display. (In the latter case, the reader of these texts will have to decide for herself). Nonetheless, Lewis-Williams adheres faithfully to this sequence and its assumptions at least as regards western Europe.

Underpinned by and based on advances in techniques (the significant ones being finer blades, projectile weapons, sewn clothing, and more efficient hearths) as they all appeared about 45,000 years ago, a vast cultural and symbolic change (manifest in parietal art, in the symbolic significance embodied in tools, utensils, figurines and statues by way of carving and painting, and evidenced in residential configurations, constructions and materials, etc.) is said to characterize early Upper Paleolithic European art, the art of distinctively modern humans. The problem of the Upper Paleolithic transition is to account for this dramatic cultural and symbolic change, or, in terms of the foregoing philosophical discussion though foreign to accounts such as those examined here, is the constitution of Spirit, born by fully developed man (i.e., modern man), in Nature.

Much to his credit and in contradistinction to his explicit effort to integrate his account of the consciousness that produces the parietal (cave wall and ceiling) art into a reductionist, physiologically

²⁴⁶ *Ibid*, 39 (chart).

²⁴⁷ *Ibid*, 71, 72 (chart).

²⁴⁸ Ofer Bar-Yosef and David Pilbeam, "Introduction" to *The Geography of Neanderthals and Modern Humans in Europe and the Greater Mediterranean*. Cambridge (MA), 2000: 1; Paul Mellars "The Archaeological Records of Neanderthal-Modern Human Transition in France and Northern Spain" in *Ibid*, 40; Bar-Yosef, "Afterward" in *Ibid*, 186. The objection to this typology is put forth in terms of rejection of a rigid technologically determinist framework.

²⁴⁹ See the remarks by Anthony E. Marks, "On the Middle to Upper Paleolithic Transition" posted in March 2006 at <https://www.geschichte.uni-tuebingen.de>

grounded explanation of behavior, Lewis-Williams' analysis is neither environmentally nor technologically deterministic, and overtly opposes both positions. He tells us, "the Transition cannot be explained by climate change alone: Human change was not the direct result of marked environmental change." Neanderthals, for example, had lived through a colder climate (which, he claims, peaked about 35,000 years ago and which in its full extent saw ice sheets covering Ireland, Britain and Scandinavia, a separate ice cap over the Alps, and frozen tundra over the rest of central Europe, with the late Pleistocene bestiary of bison, auroch, cave bear and lion, smilodontini, eucladoceros, short-faced hyena, mammoth and woolly rhinoceros some of which appear in parietal art)²⁵⁰... actually they had lived through periods of cold, warm moments within these glacial (interstadials) and warmer interglacial climates... and they had exhibited no marked transformation in their material culture. While it could be argued that Neanderthals were not humanly "creative" and hence incapable of such development (reference here to argument is inadequate, clearly unacceptable. Instead, Lewis-Williams simply notes that such environments were "the setting for... not the cause of... the western European Transition."²⁵¹ A comparison of tools of Neanderthals and modern humans and possibly their significance exhibit what is at stake: During the Middle Paleolithic (i.e., the period in Europe and Eurasia generally said to be dominated by Neanderthals), tool forms were much more uniform, and, so it is argued, their function seems to have been paramount.... Of course, there is little that survives a being 200,000 years old other than material aspects of its culture... It is as though, Lewis-Williams suggests, in the Upper Paleolithic the shape of the tool and not simply its function began to significantly matter. Made from wood, antler, ivory and bone and not merely stone, these implements, in fact, went well beyond functional necessity. "This development seems to imply that the forms of the tools symbolized social groups, within or between settlements."²⁵² In contrast to Middle Paleolithic Neanderthals, the matter can be stated bluntly, Upper Paleolithic people "had a clearer, more precise mental picture of what they wanted their tools to look like, and that picture was linked to the social groups to which they belonged. But that is not all. Upper Paleolithic tool shapes varied frequently both geographically and through time: The shapes of one's artifacts... signaled one's social group. It is hard to escape the implication that society was diversifying and was much more dynamic than during the Middle Paleolithic."

We are not going to follow Lewis-Williams' more or less adequate demonstration of the significances he assigns to these differences. But what we shall point out is that he holds such differences were products of practices animated by forms of awareness that were different in kind.

He, Lewis-Williams, provides us with a catalog of how these two distinctive kinds of consciousness were constituted, elaborated negatively with reference to Neanderthals (by way of contrast with positively what modern humans are capable of). We shall cite extensively:

Neanderthals were unable to "remember and entertain mental imagery derived from a range of states of consciousness (introverted states, dreaming, altered states, etc.),"

they were unable to "manipulate and share that imagery,"

"by such socializing of mental imagery," they were unable to "conceive of an 'alternative reality,' a 'parallel state of being' or 'spirit world' so memorable and emotionally charged that it had a facticity and life of its own,"

they were not able to "recognize a connection between mental images and two- and three-dimensional images," nor were they able to "recognize two- and three-dimensional representations of three-dimensional things in the material world," and

they did not live "in accordance with social distinctions that were underwritten by degrees of these abilities and differential access to types of mental imagery."²⁵³

Some of this is tenuous, to which we take exception (e.g., the incapacity to recount dreams or share its imagery); nonetheless, allowing these specific objections does not undercut Lewis-Williams' perspective.

More crucially, these differences in kind (between Neanderthals and modern humans) he attributes to the "neurological structure of their [respective] brains and the type of consciousness that that structure

²⁵⁰ Lewis-Williams, *Ibid*, 73-74 (citation, 74).

Neanderthals had lived through the previous Riss glaciation (about 235,000 to 130,000 years ago), with the ensuing interglacial (130,000 to about 110,000 years ago), and the last re-glaciation (Würm glacial).

Aurochs were huge wild cattle, the direct ancestors of today's domesticated smaller cattle. Eucladoceros was an extinct bush-antlered deer and smilodontini were dirk-toothed cats closely related to the North American saber-toothed tiger. All but one or two species of bison and the cattle are now extinct.

²⁵¹ *Ibid*.

²⁵² *Ibid*, 75. Emphasis in origin.

²⁵³ *Ibid*, 92-93.

produced.”²⁵⁴ This betrays a fundamental misunderstanding of the relation between consciousness and activity, work as it is broadly understood (i.e., socially reproductive activities engaging instruments, as opposed to exploited labor as it has variously formed in divided societies), the ensemble of those practices in and through human beings socially reproduce themselves transforming nature, humanizing it (e.g., vast sweeps of cultivated plants on earth today form entire vegetative ecologies that are existentially dependent upon human beings), mediate their relation to nature – inclusive of the categories in and through it is immediately apprehended and thought, and in all this create a world of cultural idealities, useful objects (including tools) and sensuous-materials structures, a world that rests on that humanized nature. Subject to our strictures against reductionism, this would otherwise require a discussion of those “neurological structures” which we can forgo.²⁵⁵ As it stands, Lewis-Williams reveals the incoherency of his position in this regard when he speaks about “the *shape* of the tool” (his emphasis) and Aurignacians’ “clearer, more precise mental picture of what they wanted their tools to look like” relative to the Mousterians (i.e., Neanderthals).²⁵⁶ Here he speaks a language that is irreducibly the language of consciousness in its relation to production:

To understand work, we must, first, distinguish between sensory-kinesthetic animal awareness for which objects come into view only as a function of the drives and affects given with their evolutionary adapted physiological-psychological constitution to one side, and the consciousness of a being for which awareness, mediated by affect, desire, need, etc., is a field, a temporal flow of lived experience consisting in its simultaneous presence to itself and a directedness to objects that are other and detached from itself, a consciousness for which the production of ideality is possible and and over geological time increasingly necessary. The former characterized animal sentiment of self, say, the primate; the latter characterizes *Homo*. Thus, it is central to the awareness of both *Homo sapiens sapiens* and *neanderthalensis*. At issue is difference in the production between the two subspecies and its significance for the being of each in its entirety.

Though this analysis is inaccessible on physicalist assumption (and thus is not undertaken by Lewis-Williams), discussion here has this sense: The Neanderthal depended on a simple representation, a functional image of the instrument, a material embodiment in a stone medium. This being did not operate with a clear image, that typical, ideal shape which guides the fabrication of an object in all its details.

Over time, the Neanderthal honed his kinesthetic and visual skills involved in fashioning an instrument to be used, say, one prepared for dressing the carcass of a dead animal that he and his fellows brought down and killed: The materials (stone) he employed in making cores from which blades, for example, were flaked away still did not exhibit the precision of the Aurignacian fabrication, nor the variety of mediums (bone, antler). Nonetheless he, the Neanderthal, engaged in both work (activity aimed at socially reproducing the community) and the labor of production, the latter because he worked on an object that itself was used to work on still another instrument (that, in turn, mediated between socially constituted need and its satisfaction) since it is the fabrication of the second instrument which counts as labor for here it is need which, so to speak, is set aside, in our terms suppressed precisely in order to satisfy that need: The preparation of the second instrument necessarily occurs in the absence of that socially mediated vital need, that, accordingly, in its absence must be guided by an inexact ideal shape, a rough image of its likeness, which permits it, in conjunction with the motor and visual skills on which he heavily depended,²⁵⁷ to be reproduced over and again. The difference between the Neanderthal (Mousterian) and the Aurignacian, on the other hand, lay in this: *For the latter, this shape was something*

²⁵⁴ *Ibid.*, 92.

²⁵⁵ See Part I, “Elements of a Critique of Reductionism in the Scientific Study of Human Origins,” above; the Appendix, *The Critique of Reductionism in the Sciences of Man*, below; and the critical discussion of physicalist reductionism in our “The Cave in the Mind: Consciousness and the Problem of ‘Active’ Materialism in the Determination of Modern Man and the Origins of the Upper Paleolithic: A Critical Reflection on David Lewis-Williams’ *The Mind in the Cave*” (Manuscript, January 2009).

²⁵⁶ *Ibid.*, 76. 93.

²⁵⁷ Here we are largely agreement with Lewis-Williams:

“True, the Neanderthals evidently had mental images of what their tools should look like... They could also understand the purposes that those tools served. But the kind of mental image that enable them to do all this was ... of an altogether different kind from the type that can be translated into a representation of, say, an animal, and compared with other people’s mental imagery to create an ‘alternative reality.’ Neanderthal mental imagery was... closely linked to motor skills – such as the series of manual action that produced a flint tool of the desired shape.” *Ibid.*, 93. Emphasis added.

The emphasis is added not as a point of agreement, but in order to single out our difference with Lewis-Williams. The image produced may well have been closely linked to motor skills, but what is decisive for us is that it did not achieve fully clarity of a universal, i.e., it was still shrouded in a sensuous envelop.

that achieved the ideal status of a type, i.e., it could be regularly reproduced, produced on demand because its production was guided by an ideal, typical image in all details of construction detached in principle from sensuous envelopment while the Neanderthal production of that image required the total sensuous context of daily life as lived and experienced.

Neanderthals never achieved the cognitive capacities that characterize fully human beings: In our view they were capable of a means-end rationality. They could produce concepts to the extent they were representations of experienced realities, e.g., the mammoth, its tusk, skin, snow, ice, clouds, etc, but not conceptual thought in the discursive and, or, logical analysis; in other words, they generated ideal images, even if not fully detailed and distinct: They were capable of intuiting essential features of an object, essences, *to the extent* it was sensuously incarnate. Thus, to this extent, they had in part achieved an existential liberation from life. To be sure, for them, like humans (for whom this liberation has gone qualitatively further), subject to drive determined needs and affects as well. Thus, too, Neanderthals were capable of speech, practical consciousness incarnate, which deepened the sociality of the banded that formed Neanderthal communities. They, of course, had a full affective life, experienced grief, sorrow, joy and love, emotions which reach back to animal life. Yet, immersed in the sensuously concrete of daily life and its tasks, it is improbable they possessed the capacity to negate the given world and project something quite radically other: They did not fully imagine. Because they had only in the limited sense specified here achieved reason (absent thought, intellectual intuition, analysis, imagining), Neanderthal Spirit and its activities did not explicitly mediate the relation of this being to the world, that is, comprehend and explain in order to act on it.²⁵⁸

Thus, by way of example as Lewis-Williams acutely notes, “as instances of material culture, body adornment and burial were both associated with the expression and construction of a type of hierarchical, or at least differentiated, society that was not simply based on age, sex and physical strength. For the Neanderthals, this kind of society was – literally – unthinkable. They probably groped to understand why Aurignacians showed respect and deferred to certain people who, as far as the Neanderthals could see, were physically weak.”²⁵⁹ (It should be noted Neanderthals, at least late Neanderthals did bury their dead, and they did understand societal hierarchy, as Lewis-Williams correctly notes just not this type of hierarchy.)

Here what is strictly characteristic of humanity (modern man), the achievement of an existential liberation from the pressures of life, is manifest in two ways: First, human beings have the capacity to make an object of, objectify, any and all internal physiological, affective or emotional-psychological and cognitive processes, states and activities. Second, human beings are capable of strict objectivity, of intuiting objects as objects independent of the perceptual field in which they appear (i.e. they can imaginatively grasp objects), of apprehending social relations, and natural and social practices, events and processes, in other words, human being are capable of strict objectivity, the determination of the objective nature of things. Neanderthals were capable of none of this.

In this respect, they were incapable of “cave art”: “...How, they may have asked, can those few marks on a cave wall possibly call to mind a real, live, huge, active bison?” Or beyond this, the entire “spiritual” realm such art intended and opened onto: “What could these Aurignacians possibly mean when they talk about the ‘spirit’ of a dead person going to a ‘realm’ where there are other ‘spirits’? Why do Aurignacians place items associated with the living, individual people in graves with the bodies of people whose lives have ended?”²⁶⁰ ...

What kind of consciousness underlay this “spirituality” in the first place?

Expanded Concept of Consciousness

We have already discussed the cognitive capacities of Neanderthals and modern humans with respect to essential abilities (production of concepts detached from sensuous envelopment, logical and discursive analysis, objectification of internal states) and, on this basis, equally essential forms of awareness (reflective memory, imaginative projection). At this point, analysis of “cave art” hinges on developing a relation between the contents of consciousness and the meaning of that art for those that originally produced and participated in it. “Contents” here does not refer to specific objects entertained or any of its

²⁵⁸For a full discussion of the issues characterizing modern humanity as such, see *The Appearance of “Spirit”: Modern Man, Her Specificity and Her Place in Nature*, below.

²⁵⁹Lewis-Williams, *Ibid.* Emphasis added.

“Types of body decoration and ornaments were sporadically absorbed into late Neanderthal culture, but perhaps only to lend a superficial resemblance to their more astute and complex Aurignacian neighbors.” *Ibid.*

²⁶⁰*Ibid.*, 93.

own states objectified by and for awareness; rather, it is intended to indicate the types or kinds of awareness human beings, so to speak, enter into. In this regard, consciousness as practical interiority that is the inverse of practical language, i.e., speech, extends far further and deeper than those activities centered on the waking awareness of daily life, its tasks, relations and transactions. However, as Lewis-Williams recognizes, there is a long tradition cutting across disciplines and fields of study that sees problem oriented cognitive activities as central to a consciousness that moves between it and states of daydreaming and sleep based dreaming at its extremes.²⁶¹

In standard accounts, this is what might be called the "normal" trajectory. However, this understanding of awareness restricts and limits it, falsely privileging rationalistic constructions: This normal trajectory is merely one direction in which awareness moves. We can move away from the waking, problem oriented thought of daily life in another, second direction, call it an "intensified" trajectory.²⁶² If, *at its extremes*, the former is characterized by daydreaming (reveries, consciously intended fantasies), hypnagogic states (drifting off to sleep), dreaming, and fully unconscious, autonomic activity (which for the most part in our view characterized Neanderthals as well as modern humans); the latter is an inward directed fantasy, induced by intense concentration, drugs or stimulants, sensory deprivation, extreme hunger, producing internally generated imagery that is other than sleep related. It constitutes a spectrum of experienced visual percepts ranging from geometric forms (dots, zigzags, grids, meanderings) that flicker, expand, contract, combine and includes visions, hallucinations, and trance states. Thus, this intensified trajectory consists in altered states of awareness.²⁶³ In hunter-gatherer communities of the upper Paleolithic, these states of awareness were consciously produced and elaborated by ritual specialists, shamans, who pursued social power, not immediately, not directly, but in rarefied form.

Historically contemporary accounts of archaic communities can be drawn on to facilitate clarity.

Shamanism among hunter-gatherers is based on an array of intensified altered states of consciousness. (We can further note that in the whole long historical development of agriculture, stratified societies and the state and in contradistinction to archaic communities, under the impact of the social organization of labor and the repression of impulses, desires and needs requisite to its performance, the latter is disparaged minimally but most often criminalized or characterized as manifestations of severe mental instability, or in contemporary language as psychosis.)

Now, shamans, not to mention Upper Paleolithic hunter-gatherers as whole communities (and certain archaic communities well down into the twentieth century), believed in spiritual realms above and below the world of daily life: Brought on by the use of hallucinogens, by intense hunger, extended sensory deprivation, etc., the visual, auditory and internal bodily experiences of those intensified, altered states of awareness gave (gives) rise to perceptions of an alternative reality that was (is) often "tiered," that is layered along these three dimensions (daily life, above and below). The latter two, alternative realities were (are) experienced and understood as more real, "really real," worlds of animal spirits. The worlds of above and below are not only other but transcendent, though to be sure they are, as we shall see, immediately accessible from within the world of daily experience. In respect to this transcendence and, in a minimalistic sense, chronologically, hunter-gatherer experience of otherworldliness anticipates the more stratified (in terms of access), more formalized and abstract (in terms of divinities) religious experience of gods of early agricultural societies as they first appeared in the Middle East and the Levant.²⁶⁴

On this basis, the following can be drawn out. First, among hunting and gathering communities, shamans are individuals with special powers as well as skill that provide them with extensive access to the realities of above and below. Second, shamans utilize the experience of dissociation from the body as lived, and other experienced states of altered awareness to achieve specific social and community objectives by way of contact with spirit-like and other a-natural beings. These include healing the sick, exercising control over the movement and lives of animals that in part form the basis of the social reproduction of the community, and changing the weather largely with a view to those animal movements. All of these practices were (are) believed and assumed to be facilitated by supernatural entities, beings that exude potency or power and animal-helpers and other categories of spirits who help shamans and are themselves potent.²⁶⁵

This context is decisive, for it allows us to understand the alternative realities as they are entered and

²⁶¹ *Ibid*, 123.

²⁶² *Ibid*, 124.

²⁶³ *Ibid*, 124-126. Lewis-Williams calls these entoptic phenomena.

²⁶⁴ *Ibid*, 132-133.

²⁶⁵ *Ibid*, 133.

experienced as both as *archaic element of soft social division (i.e., absent stratification based on control of production)* and as *a theoretical mediation that, comprehending and explaining the "tiered" structure of reality*, permits hunter-gatherers in the person of the shaman to act on the natural world, rendering it more pliable as it were to human-social reproduction. It further within this context that we must situate parietal art as it appeared in the Upper Paleolithic.²⁶⁶

What is important to note here is *the strictly ideational elements can and will strengthen, develop and integrate (rendering it more difficult to abolish) hierarchy within daily life, thereby in distinctively human form ironically reproducing, creating a stranglehold of, natural determination and natural determinism over human beings.*

Climate Change, the Fate of the Neanderthals, Societal Hierarchy

The physicalist reductionism that Lewis-Williams affirms is contradicted by the contours of an account

²⁶⁶Here we situate Lewis-Williams genuine contribution to comprehending the autonomy of "prehistorical" thought as thought itself in his discussion of cave art so-called. He has no share in the vulgar, Eurocentric bigotry about "primitiveness," recognizing that archaic hunter-gatherers (and historically contemporary ones) cognitively possess the same capacities for symbolic thought as, say for example, Western philosophers of the short twentieth century (e.g., Wittgenstein, Heidegger, Popper).

In this context, Lewis-Williams goes far beyond crude representational accounts of the function of art in social life that litter the same Western traditions of art criticism. At the same time, he opposes the view that art, specifically image-making, body decoration, music, dance, "was a unified, symbolic or aesthetic component of a package that came at the end of a causal chain of *environmental factors*" (*Ibid*, 37, also 73).

Let us first note that most all depictions are deep underground, not at all near any actual living space of or shelters utilized by the Aurignacian hunter-gatherers. (In some cases, there were no living spaces within the caves with art at all.) The centers of "cave art" were, in fact, ceremonial and sacred centers, and not the context for pursuing quotidian, chambers and galleries at Pech Merle, Altamira or above all Lascaux, we will *not* notice representational images in the mass of lines, curves, amorphous forms... unless, of course, we already anticipatory have a sense of images, of a late Paleolithic bestiary which we bring to bear on what we see. This, however, would be a contemporarily based, reproductive activities. This insight is, again, premised on discarding environmentally determinist explanations.

If we examine, for example, some of the well-known cave sites, the Salon Noir at Niaux, the halls, passages, shafts, retrospective projection, for there are neither two nor three dimensional representations in cave art. Dimensional representations are the product of a long tradition of the production of such in the West, and seeing images in such a manner is learned, cultivated and transmitted. By way of a counter-example, we can cite contemporary, archaic experience: A New Guinea people, the Abelam, had extreme difficulty in "seeing," i.e., immediately apprehending the image that is reproduced in, photographs. If shown a picture of a person who has been captured in a rigidly straight-ahead position, an Abelam can see the image. But if the person is captured in action, or for that matter, not looking right at the camera, the Abelam is at a loss at to what is viewed... Younger people can be taught to grasp these images in a few hours, assimilating the conventions that underline them, but intuitively seeing photographic images is an operative skill, something learned, embedded in perception itself (here visual perception), and taken for granted and naturalized (i.e., mistakenly assumed to be "natural"). Among these people, though, such seeing is not an assimilated, learned and taken for granted skill, socialization to photographic images is not part of their formation. We repeat, seeing two-dimensional images is learned, not "natural." (*Ibid*, 183. Here Lewis-Williams cites A. Forge, "Learning to see in New Guinea," in P. Mayer (ed.), *Socialization: The Approach from Social Anthropology*. London 1970: 269-290.) Hunter-gatherers did not "invent" "two-dimensional images of things in their material environment" in the form of cave paintings. Instead, "a notion of images," that is their meaning, sense and their *function* for them, "were part of their experience before they made parietal or portable images" (Lewis-Williams, *Ibid*, 185).

"If we could be transported back to the very beginning of the upper Paleolithic so that we could compliment a painter on the 'realism' of his or her picture, I believe we should have been met with incredulity. 'But,' the painter might have replied, 'that is not a real bison; you can't walk around it; and it is too small. That is a 'vision,' a 'spirit bison.' There is nothing 'real' about it. For the makers, the paintings and engravings were visions, not representations of visions..." (*Ibid*, 193-194). Lewis-Williams holds (and in our view his overall presentation in this regard demonstrates) that cave art was and is *not representational*.

The images do not exhibit for us what animals, or animal spirits, look like: The paintings are not intended to "look like" something in nature, to reproduce and re-present.

Instead, there is, or was, some sort of *interaction* between cave wall depictions and the rock formations themselves (*Ibid*, 37): Caves contain handprints, finger markings, and meandering patterns traced by fingers in the soft clay, beyond the images. Protuberances from the walls have been marked with paint so that they appear to be animal faces (or bodily sections) looking out at the individual facing them... exhibiting interaction between image-maker and cave wall... meaning the wall itself embodied significance and was not merely a neutral prop for an image (*Ibid*, 37, 182, 216-220). Thus, this sense (significance) is held and constituted socially; it is not the sole property of an individual, that of an "artist" so-called, a position that at any rate completely skews the meaning and significance of cave art. If and then when art, its making, appeared, it was an active moment of a dynamic nexus of interrelated moments, each calling the others forth:

Stunningly Lewis-Williams argues, this dynamism involved a relation of the persons engaging the cave wall images to

which, the reductionism notwithstanding, asserts the irreducibility of consciousness as a social phenomenon characterizing humanity within nature. The outlines of a critique of reductionism in Lewis-Williams' analysis have at any rate already been presented.²⁶⁷

Here we shall conclude this discussion by considering the fate of the Neanderthals by way of a further elaboration of this critique, of a critical assessment of the specificity of modern man, and with a view to the central albeit sometimes submerged theme in this essay, namely, *the assertion of natural determinism in humanity by way of the reproduction of hierarchy in social relations*.

Begin by considering the relation of Neanderthals and humans to one another. We shall start from the standard approach, residues of material culture, the periodization erected upon them, and a vocabulary which uncritically, mystifyingly and wrongly assumes materials, fabricating methods and procedures, and finished products form elements of (quasi autonomous) distinct sphere of human activity, a technology, characterizing all social organization in human history.²⁶⁸

The evidence, not so much for a modern human presence in Europe as such (which can be otherwise established, e.g., through burial sites) but, for the timeline of an Aurignacian colonization (based on radiocarbon dating) is the appearance of new "technologies" brought with them by the newly invading populations. These technologies included bone and antler tools and objects such as necklaces and brackets with their distinctive shapes. In relation to the immediately antecedent Neanderthal tool complex, they constituted a sudden departure. They also suggest the "classical" route of Aurignacian "dispersal," a geographically broad sweep that, beginning from the contiguous Levant, ranges over southeastern, central and western Europe. The dating indicates a concentration of this movement during the period from 38,000 to 34,000 years ago, with solid evidence the aforementioned products and the materials and procedures used in crafting them, the new technologies so-called, were present some 40,000 years ago in the eastern Mediterranean and southeast Europe. A second route is also visible in a distinctive technology (distinct from those of immediately preceding Neanderthals, and from the mature Aurignacian technologies to which these stand as earlier or "archaic") whose dispersal, and it is inferred that of those human groupings producing these objects, can be found from northeastern Italy to northern the world they open onto, a tiered world that entails an extra-natural realm of animal spirits which are "accessed" from the wall art, that, in turn, is accessible because they, the wall images, are themselves *avatars*, *literally living embodiments of the animal spirits themselves*. The relation is crucial: Controlled by shaman, it is grounded in the practices of daily life, that of reproducing the community through hunting and success in hunting of these animals (bison, reindeer, aurochs, horses, felines – so-called cave lions, ibexes, etc.), a success that is assisted by absorbing the powers of these animal spirits and being in contract with them as they move among the living herds. In this respect, visions were not enough. They had to be fixed (*Ibid*, 193): Grasping the previously mentioned protuberances, hand printing and finger markings that often appear in and along "cave art" images were acts of immediate, affective embracing the animal spirit itself, not a question of coming into contact with it or reaching out to it, but momentarily becoming it. How is this possible? It was possible as an ecstatic, albeit limited version of shamanic activity, perhaps a product of intense concentration and existentially supported by unshakable convictions about the reality of this tiered world, carried out, if you will, by the mass of hunters and gatherers as uninitiated. Primarily an activity pursued by the shaman who, in the extended states of awareness (what Lewis-Williams, as we noted, calls intensified trajectories of consciousness) brought on by sensory deprivation, hallucinogens or otherwise that entailed dissociation and disembodiment (*Ibid*), went on and passed through the wall by way of embracing the animal spirit, passing through to a dangerous spirit world (which starting from *below* actually leads out to *above*) in an arduous journey to effect the social objectives of the community by harnessing the animal spirits as the shaman himself (herself) assumed a zoomorphic persona in the spirit world (*Ibid*, 195).

To comprehend how, in immanent terms, this was at all possible, however, presupposes we completely abandon any representation concept of art. Recall this all occurs deep underground... where access to the spirit world is gained. Here, only if the cave wall was not a rock wall at all, at best merely a prop for the image, can images appear "not so much painted onto rock walls as released from, or coaxed through, the living membrane (rather than 'veil' if we think of the bowels of the earth) that existed between the image-maker and the spirit world..." (*Ibid*, 199-200), a living membrane that gave direct access to the animal spirit world. (In this regard and with respect to the tiered reality inclusive of the animal spirit world of the Aurignacians, Lewis-Williams refers to Neanderthals, correctly we think, as "congenital atheists" *Ibid*, 192.)

In our terms, the activity of the shaman socially concentrated the effort to comprehend and explain, and to act in effecting the essential shape of the world of hunting and gathering inclusive of all those forms of lives that populated it. In this respect, shamans should be seen as bearers of the traditions of a community of hunter-gatherers, mediating relations (perhaps through the same spirit world) with the ancestors, past members of the community. For remarks to this effect, see Fagan, *The Journey from Eden*, 172.

²⁶⁷Other than the foregoing discussion, see Part I, "Reductionism and the Meaning of Society in the Study of Human Origins," above.

²⁶⁸See *Capitalism and the Domination of Nature*, Part III, "Techné I and II" (two sections), where the historical specificity of a separate technology is demonstrated.

Spain on its Atlantic coast on a line that largely runs along the Mediterranean coast of Europe.²⁶⁹

Now Aurignacian populations had to come into direct contact with Neanderthals because along these routes of colonization we find similar evidence of the heaviest Neanderthal settlements. Thus, both groups were aware of each other, in many instances living side by side. This much is not in dispute. The archaeological record, that is site discoveries, excavations and evaluations, tells us "living side by side" did not entail the social co-penetration of Neanderthal and modern human groups in the practices of daily life: The two groups retained their separate communities and did not live or hunt together... This was not universally the case, but it was by and large so for several thousand years... The foregoing implies geographical proximity, and has two further ramifications.

First, Neanderthals adopted certain features and technics of the Aurignacian "tool kit" as evidenced by the "supersession" of the Neanderthal Mousterian by, abstractly (i.e., technologically) considered, the last phase of Neanderthal technical development known as the Châtelperronian. At Arci-sur-Cure in central France, for example, simple bone tools (as opposed to stone one) and various furrowed or pierced animal-tooth ornaments have been found. Our position on the assimilation of technically superior practices manifested in tools and adornments is clear: They were, in fact, borrowed ...especially blade technology since in both cases the products served the same end (dismembering flesh and cutting muscle, scraping bone) which we suggest Neanderthals were patently cognitively capable of grasping. Adornments were imitated, for it is reasonable to suggest body painting may have been perceptually pleasing. But the symbolic meaning incarnated in certain artifacts, e.g., ivory statuettes – portable art so-called, the grave goods at burial sites (beads, fox pelts), and "depictions" as in wall and cave paintings were simply beyond Neanderthals.²⁷⁰

The second ramification concerns populations as demographical groups. It is difficult to accept that Neanderthals and modern humans did not have sexual contact, probably extensive, some of which may have been voluntary and probably a whole lot of which was forced (rape), likely from both sides. There may have been some interbreeding, and at the time we originally penned this (January 2009) the evidence was simply inconclusive. Since then the long-term work (decoding the Neanderthal genome) of a team headed by the evolutionary geneticist Svante Pääbo at the Max Planck Institute has borne fruit. It is now believed among all non-Africans populations that about 4% of all contemporary human DNA has bequeathed to us by Neanderthals.²⁷¹ This likely means that offspring of modern humans and Neanderthals were functionally integrated into the society and culture of the Aurignacians. We think this strengthens the view put forth here. In other words, the children of these relations, probably slightly dull witted as a rule, were *enslaved*.

Yet most authors resist the suggestion that modern humans murdered Neanderthals en masse, what in today's terms would be called a genocide, and perhaps, if it occurred, the most successful ever undertaken.

Let's consider the alternatives.

The notion that Neanderthals succumbed to climate change cannot be taken seriously. First, Neanderthals had been in Europe for at least 160,000, over 200,000 or as long as 240,000 years depending on who one reads. The Würm, the last glaciation ended roughly 130,000 years ago with a transition to and from an interglacial, and an interglacial, that taken together lasted 15,000-20,000 years. So at the very least Neanderthals as a species had lived through a glaciation, a vast and rapid warming, and most of another glaciation before they disappeared.²⁷² Second, the period in which Neanderthals as

²⁶⁹Paul Mellars, "Neanderthals and the Modern Human Colonization of Europe." *Nature*, 432, 25 November 2004.

The route of settlements of the earliest agricultural communities across Europe between 10,000 and 6,000 years ago later reproduced these two patterns, a northern route along the Danube valley and a southern one along the northern Mediterranean coast.

²⁷⁰Similarly, Lewis-Williams, *Ibid*, 84, 90-92.

²⁷¹Popularly see, for example, Elisabeth Kolbert, "Sleeping with the Enemy," *The New Yorker*, 15/22 August 2011, 65-75.

²⁷²The last glaciation was not undifferentiated, i.e., uniformly cold: There were periods of extended warmth within in. (We shall return to this shortly.) That period that most concerns these climatic variations together with Neanderthals has, in sound methodological fashion, been detailedly and meticulously reconstructed in Stage 3 project essays brought together in Tjeerd van Andel and William Davies (eds.), *Neanderthals and Modern Humans in the European Landscape during the Last Glaciation*. McDonald Institute for Archaeological Research, Cambridge, 2003.

Now even if it can be shown that the period beginning from roughly 35,000 years ago witnessed a marked deterioration in climate, with intense cold from 30,000 to 20,000 years ago (van Andel, "Glacial Environments I: The Weichselian [Würm] Climate in Europe between the End of the OIS-5 Interglacial and the Last Glacial Maximum," *Ibid*, 9-19: 10-12), it cannot be said to have decided fate of the Neanderthals: There is still the unresolved question of the two previous

a species were for the most part thought to have disappeared, 35,000-30,000 years ago, was the latter phases of the last glaciation, in a cold to which they were supremely well "adapted," to use the Darwinian expression which we intent ironically. The view that their evolutionary departure was a direct consequence of climate change can be dismissed out of hand.²⁷³ Nonetheless, climate change may have played a highly mediated role in this disappearance.²⁷⁴ We shall return to this...

The more sophisticated argument and contemporary paradigm is that, within the context of a "direct competition for space and resources" (Mellars), Neanderthals suffered demographic collapse. In this regard, Lewis-Williams refers to a "demographically competitive situation" and, pointing to the "competitive circumstances towards the end of the Châtelperronian," argues "between 45,000 and 35,000 years ago they," Neanderthals, "had to cope with the new arrivals."

They were now participating in a new world of social relations, something with which they never had to contend before. The new challenges were not environmental, like the ones with which they had glaciations. For even if these glacials had long periods (i.e., a couple or more thousand years) of intermittent, interstadial warmth, the argument that intense cold did not also characterize these glaciations is unevicenced, and where unevicenced on the face of simply untenable. (Reconstruction of these glacials still awaits a group of intrepid researchers, for it may not be possible.)

Yet emerging as a separate species of *Homo* (or, preferably a subspecies of *Homo sapiens*), Neanderthals date back at least 400,000 years and perhaps further. Driven by the dynamic interaction of activity (in their case hunting), by sociality, speech and tool usage, if the full constitution of a(n) (evolving) species of Neanderthals did not present itself until 250,000 years ago, is it possible to think that this being became less able to cope with cold, to "adapt," as a product of that very evolution? Not likely. Not at all. (See Leslie Aiello and Peter Wheeler, "Neanderthal Thermoregulation and the Glacial Climate" in van Andel and Davies, *Ibid*, 147-166, for a detailed discussion reconstructing Neanderthal physiological "fitness" relative to cold, and in comparison to *Homo erectus* and modern man.) A straightforward explanation of Neanderthal extinction based on intense cold makes no sense.

²⁷³To this point, Lewis-Williams agrees, noting further. "During the period from about 60,000 to 40,000 years ago, they developed regional variations and micro-adaptations: Their development had not ground to an absolute halt; their culture was not terminally moribund." *Ibid*, 95.

Even late Pleistocene megafauna in all likelihood did *not* succumb to climate change (ending ice age climates, bring about the disappearance of the cold, ice and snow on the steppe and tundra), did not vanish, even as they, most slow breeding mammals, were evolutionarily ill-suited to the new climate, the rising temperatures, aridity in formerly well-watered regions and the changing flora which may have not exactly fitted the nutritional requirements of the great herbivores. Ranging from massive slaughter by newly appearing human populations to the evolutionary dwarfing of gigantic mammalian species (for the former, see Paul Martin's publications cited below; for the latter, Donald Patten, "A Comprehensive Theory of Aging, Gigantism and Longevity," *Catastrophism and Ancient History*, 2, Pt 1, August 1979), various theorizations, none satisfactory, have been put forth to account for their disappearance. (Note we did not say extinction since in at least one theorization this is what is at issue.)

²⁷⁴While we hold the view, or a version of it mediated by climate, that anatomically modern humans were largely responsible for Neanderthal extinction, and we also hold that there is no basis for holding, say by analogy or imputation of existentially similar behaviors, that the early inhabitants of the Americas drove megafauna to extinction through mass slaughter, we are required to state why we maintain what might *seem* to be contradictory positions:

In the Americas (north and south), the argument for climate induced megafauna extinction is weak; that against it well developed and coherent, *though it remains merely an argument and though the evidence itself is almost entirely absent* (i.e., though the argument for human agency in megafauna extinction is put forth in a series of speculative claims that logically cohere, the evidence supporting this position amounts to a single finding, a single site where a blade type associated with Paleo-Indians and just one species, mastodons, of the fifty-seven which went extinct, were allegedly hunted, killed and butchered). Now the core of that construction is the placement of humans in the Americas beginning roughly 12,000 years ago: This argument rests on low sea levels, a dry Beringia, crossing of human hunting populations that followed giant mammalian populations through the mountainous, a treacherous ice-free corridor between the Cordillerian and Laurentide ice sheets lacking the resources to support mega animal life in ice free central and southern continental regions of North America, and the selective use of radiocarbon dates that are suspect from the get-go.

The fount for this view is Paul S. Martin. Though his original contribution dates from 1967, his most detailed presentation remains "Prehistorical Overkill: The Global Model" in Paul S. Martin and Richard G. Klein (eds.), *Quaternary Extinctions: A Prehistorical Revolution*. Tucson, 1984. With the same speculative structure, logical cohesiveness, and lack of evidence, the argument is also advanced and very well presented by Richard Leakey and Roger Lewin, *The Sixth Extinction*, New York, 1995 (Chapter 10). Martin's parting riposte in this long running debate (*Twilight of the Mammoths: Ice Age Extinctions and the Rewilding of America*. Berkeley, 2005) is eloquently laid out; nonetheless after more than thirty-five years of continuous fieldwork, it still suffers the same limitations.

Whatever the situation elsewhere,* the basis of the argument rests circumstantially on the temporal coincidence of an alleged novel human presence and megafauna extinctions. This is not coincidental, *for the evidence extending from material culture to cosmologies and world-visions and their objectified and materialized embodiments* (and it is overwhelming) ... including blade technologies, clothing and footwear,** the horizon calendar structure, and Eskimo Indo-European linguistic structure... points to the fact that *the original human inhabitants of the Americas migrated from a polar region, and started from the northwest quadrant of Europe. The migration, moreover, is at least 40,000 years*

previously managed to cope. Now their surroundings contained more complex *Homo sapiens* social communities and, especially threatening to their way of life, various forms of symbolism that point to a more efficient way of life that they could not emulate. These new, challenging components were beyond their kin.²⁷⁵ He adds, "the arrival some 45,000 years ago of anatomically modern Aurignacian people" witnessed the appearance of "complex social structures, sophisticated, planned hunting, diverse symbolic behavior and, of course, image-making" all of which the Aurignacians "brought with them." referring to the "suddenness with which this new package appears in western Europe and the comparative speed with which it replaced the old Neanderthal way of life," the consequences, if not had foreordained, were predictable and "certainly striking."²⁷⁶

Further, Lewis-Williams suggests Aurignacians "must have realized that the Neanderthals did not have these abilities; they must have seen that, whatever else the Neanderthals may have been able to copy, this was something that they just could not manage. The exploitation of a particular kind of consciousness and mental imagery for social concerns thus became, for the Aurignacians, a major distinguishing feature of their society vis-à-vis their Neanderthal neighbors. That their possession of it would have engendered a sense of superiority over the Neanderthals and colored their relationships with them are inescapable conclusions." This situation constituted "a conflictual scenario of social division."²⁷⁷

239 In summary fashion, finishing Mellars' earlier remark cited above, we may say that situation on the whole was "a straightforward case of direct competition for space and resources between the two populations, in which the demonstrably more complex technology and apparently more complex organization of the anatomically modern populations would have given them a strong competitive advantage over the Neanderthals."²⁷⁸

Now this argument ...especially in Lewis-Williams' strictly social formulation that rests on a reasoned rejection of an environmental explanation...does not culminate in an exterminationist thesis. Instead, as a type of argument (already visible in the Mellars' citation immediately above), it illicitly sinks down below the level of *sociality* and, naturalistically, embraces a classical, and *untenable* Darwinian perspective:

"Because they were able to forge symbolically sustained networks and fields of power, the Aurignacian population built up. Eventually, competition for resources became more intense and violent... We can isolate a major difference between ...earlier cold periods [Neanderthals had survived] and the Transition: At the Transition there was another human species on the landscape and therefore greater competition for resources. Even smaller disadvantages, such as higher infant mortality, can tip the balance. If *Homo sapiens* communities were able to store food through the winter and the Neanderthals were not able to

old. See Werner Müller, *America: The New World or the Old?* Frankfurt am Main, 1989.

[In a study that only came to our attention sometime after we had researched and composed this work, Charles Mann carefully reviews the archaeological, paleo-anthropological, paleo-climatic and genetic evidence which post-dates the materials examined here. He convincingly demonstrates the "Clovis consensus" exemplified by the work of Martin has collapsed. Charles C. Mann, *1491: New Revolutions of the Americas Before Columbus*. New York, 2011 (2005): 182-196.]

²⁷⁵Lewis-Williams, *Ibid*, 94, 95.

²⁷⁶*Ibid*, 96.

²⁷⁷Actually, this remark refers to "the dynamic behind the efflorescence of upper Paleolithic art" (*Ibid*, 95): For it "was when inter-species [relations]... reached a certain level of intimacy," which was nonetheless underpinned by "growing population density and competition for specific resources" "that the Aurignacians found it necessary to escalate the making of representational art out of their existing mental imagery; the images that they made were, in part, statements about their social dominance and helped to entrench that dominance. Image-making thus reflected and played an active role in the evolution of social relations right from the beginning." *Ibid*, 95.

²⁷⁸Mellars, "Ibid."

In Darwinian adaptationist idiom, Mellars, like Lewis-Williams, here speaks the mystifying language of bourgeois theory (political economy and philosophy, i.e., Hobbes) in its obfuscatory characterizing of society as such as it retrospectively projects its own specific societal structure with its *bellum omnium in omnes* back into prehistory.

* In Australia, and in more recent times (i.e., within the last eight hundred years) in New Zealand, Madagascar and elsewhere (e.g., Hawaii), mass extinctions occurred as giant kangaroos and a marsupial lion, several species of moas (a bird much like the ostrich), and a giant tortoise, lemurs and an emu (an elephant bird)... and more, first the herbivores and the great predators that preyed on them... all disappeared as what appears to have been a direct result of human slaughter independently of any climate change (Colin Tudge, *Neanderthals, Bandits and Farmers*. London, 1988: 20-24).

** Here we can note the difference in garments that are specific to vast regions: In central and southern Asia the Kaftan, frock or coat open at the front, was worn; while in North America (and a tiny sliver of coastal Siberia) and all of Europe

do so, *Homo sapiens* child survival rates would have been advantageous.²⁷⁹ Yes, of course. But then it might also be recalled that Neanderthals were consummate wintertime hunters; and, yes, of course, but it can be further recalled, not three paragraphs earlier Lewis-Williams was writing, restating a generally accepted view, that hunting strategies and objectives were entirely different and compatible, Neanderthals pursuing the megafauna of all sorts, Aurignacians small game of a limited sort.

Citing Ezra Zubrow, Lewis-Williams notes further, "a small demographic advantage in the neighborhood of a difference of two percent mortality will result in the rapid extinction of the Neanderthals. The time frame is approximately 30 generations, or one millennium." Here, then, is an explanation for the rapid extinction of the Neanderthals...²⁸⁰

Mystifyingly prefaced by a social analysis, this is a straightforward Malthusian development of Darwinian theory. Because it utterly fails to recognize that the "environment" (i.e., available resources) is not inflexibly given, that socially formed and controlled behaviors even among primates mediate the relation of demographic density to those resources, that hominid species in particular are capable of generating new and different resources from out the existing environment, and that humans not only carry out these limited natural transformations but produce novel objects, events, processes and relations (among all these foods) in practices of remaking nature, Malthusianism, as we have extensively argued above,²⁸¹ 243 is not coherent, defies all evidentially grounded analysis and is, accordingly untenable.

Return to climate change and, in this context, we can now state on overall position.

Temperatures in the last glaciation during the geologically current ice age were not uniform. In the Northern Hemisphere, it is known that during periods known as Dansgaard/Oeschger events,²⁸² rapid climate fluctuations (warmings) occurred, and one occurred at approximately 40,000 BP. Conversely, there were periods of plummeting temperature known as Heinrich events, the two most important during the last glaciation at 65,000 BP and about 30,000 BP.²⁸³ While the former may have lasted longer (7-8 thousand years), the latter appears to have been very much colder (based on ice cores about 28,000 BP for about a thousand years). The deep freeze that swept across Europe would have forced the great animals, megafauna (e.g., mastodon, reindeer, auroch), that lived in the central regions of western and central Europe southward, and they may not all have been able to move at a pace rapid enough as the cold killed the plant life they, as herbivores, depended on to sustain themselves. A decline in the sheer numbers of this animal life would have adversely affected the Neanderthal populations, since they were without doubt heavily depend on the very large herbivores (the woolly rhinoceros and mammoths), their meat, with very little in the way of a varied diet (nuts, plant life).²⁸⁴ It is in this context, one in which climate change plays a more mediate role, that we situate the remaining remarks.

Over the last 5,000 years of their existence, the differences between Neanderthals and modern humans culminated in repeated, a lengthy series of, ongoing fights, skirmishes and ambushes in different places and different times among different bands that wore down Neanderthals, demographically reduced them below a level at which they could continue to carry on these fights, and compelled them, as technologically and socially inferior to move on. (Lewis-Williams thinks conflict existed but was

and European Russia the pullover poncho was worn. Across the same regions, the moccasin is counterposed to the sandal, sandal boot or stocking boot. See Müller, *Ibid*, Maps 1 and 2 following 395 pages of text and 38 pages of plates.

²⁷⁹Lewis-Williams, *Ibid*, 88.

²⁸⁰*Ibid*.

Zubrow's remarks are cited from his "The Demographic Modeling of Neanderthal Extinction," in P. Mellars and C. Stringer (eds.), *The Human Revolution: Behavioral and Biological Perspectives on the Origins of Modern Humans*. Edinburgh, 1989.

²⁸¹See Part III, "Population and Environment: Overthrow of the Classical Darwinian Theory of Natural Determinism," above.

²⁸²Wally Broecker, *The Great Ocean Conveyor*, 50-51, 55-56, 72-73.

²⁸³*Ibid*, 72-73, 75-76.

The causation in these (Heinrich) events are easier to discern. Ice regularly calves off from coastal glaciated landmasses. These form icebergs, and in some case their numbers were massive constituting a veritable "armada." In the cases in question, these were iceberg armada that drifted eastward from the North American mainland toward eastern Greenland. As they melted, their water greatly diluted the saline content of the North Atlantic in the area of the downwelling of waters that account for the ocean conveyor action at its origins. This action altered the density driven character of the thermohaline circulation. The circulation shifted southward, and the warm waters it brings with it from the Gulf of Mexico in its northern circulation was diverted. Absence of warm water meant that in the North Atlantic, there was no warm air that rose, blown eastward by the prevailing winds, and, accordingly, no warming of the British Isles, northwestern Europe and Scandinavia. The temperatures over western Europe as a whole plummeted.

²⁸⁴Katerina Harvati, "Neanderthals and their Contemporaries" in W. Henke and I. Tattersall (eds.), *Handbook of Paleoanthropology, Vol. III (Phylogeny of Hominids)*. Heidelberg, 2007 (1717-1748): 1732-1733.

intermittent.²⁸⁵ The thesis is too weak, placing too much reliance on a naturalistic-demographic solution.) Under these conditions, and as modern human population became increasingly larger and this density transformed them into *de facto communities – alliances of large bands* formed both for trade and politically in a fight against Neanderthals (one that had developed its own logic and had become a life and death struggle), various bands of the latter could not constitute themselves in a given region as population groupings larger enough to sustain themselves without their very presence becoming a provocation to the Aurignacians who, having noticed them, would renew the fighting.²⁸⁶ ...As meat eaters with a pronounced sexual dimorphism (by human standards), i.e., with a division of labor in which the males were largely responsible for hunting and killing megafauna game, we can grasp the hints of the absence of the transcendence of natural determination - hierarchy - in Neanderthal societies. In modern European humans too, in their grave goods and in the presence of shamans amongst some groups we see more definitively the same natural determination. Two dispersed types of populations confronting one another on the basis of distinct, yet qualitatively similar forms of societal organization (in the strictly social sense), of this specific form (hierarchy embodying organization according to the imperatives of nascent Power), would tend to solve confrontation through a fight, perhaps a fight to the death... Still even these conditions would not have resulted in a demographic collapse in the naturalistic sense: Rather, that collapse did occur but it was socially mediated by, intertwined with and inseparable from overwhelming fear and anxiety, demoralization and finally disintegration of the affective bonds that held these small bands together.

Modern humans may not have consciously aimed at exterminating Neanderthals as such, though we think this was one pole of a dual intent, the other being driving Neanderthals from the territories they hunted (without regard to the observable fact that the prey Neanderthals hunted was quite different from that pursued by Aurignacians). Whether or not it was the sole motivation, effectively, the outcome was the same.

The Origins of Man *Summation and Perspective*

The disappearance of Neanderthals from the face of the Earth reinforces the view of the uniqueness of humanity in nature, and leads to the conviction that man is separate from the rest of nature. (In societies of capital deep in the era of real domination, it supports the conviction, and false consciousness, that man is uniquely productive, creative and existentially autonomous in relation to the rest of nature precisely to the extent she remakes it in its entirety. In point of fact, it is the movement of capital that in this epoch is remaking the Earth as a whole.)²⁸⁷ In contradistinction, let's us summarize the rests of our investigation and analysis and see if we can articulate a coherent, alternative perspective.

Generally speaking, primate (and hominid) orientation to the nature in which it is (and was) immersed, and the genetic changes that solidified it, were not the chance product of the fitness of individuals; rather, it was the outcome of the dynamic of social organization that found the bulk of the community settling a given territory, compelling a peripheral band to go beyond this situation, both the community's range and its primary resources. For, relatively speaking, resources in the narrow sense, food, were either inadequate or, for reasons of its distribution within a hierarchically organized community, inadequately accessible to those who formed the periphery. It was not the case that isolation of such bands invariably led to their extinction: In this relative sense, and under these conditions, most likely those of climate change, individuals who had become superfluous within the community, played a productive, positive role in evolution, promoting, as it were, new skills, and ultimately a new relation to the surrounding world. Breaking with the old community, and establishing a new one on the basis of developing resources (skills and tools as well as food), placed the new community on a novel foundation; while, in and through the practice that developed these resources, over generations the species anatomically changed itself in appropriating these resources and in socially mediating (in song, dance, collecting as well as scavenging

²⁸⁵ Lewis-Williams, *Ibid.* 87

²⁸⁶ If we take the minimum demographical density at which humans, abstractly considered as a population grouping, can sustain themselves as roughly 250 individuals, then living in bands of, say, 25-30, would have meant 8-10 bands of Neanderthals living and hunting in a region small enough to maintain regular contact. It was the presence of Neanderthal groups of this size in a region dominated by modern humans that would have formed the "provocation." The chronologically latest archaeologically discovered Neanderthal encampment dates to 27,000 years ago in northern Spain.

²⁸⁷ See *Capitalism and the Domination of Nature*, "Capitalist Criminality," and Part II, "The Geophysiology of the Earth, V: Climate Change Causation."

and hunting) this appropriation. This led to its evolutionary transformation.

Long before specifically modern human communities appear, the autonomy of population in the relation of organism and species to environment at the same time constituted a reorganization of this relation in which behavior, which includes, as we have seen, skills, tools, practices and elements of a non-material culture, all played the central, determinately mediating roles.

So, society reaches back into nature, as far back as its very vital foundations, yet nature too extends forward to the most advanced aspects of specifically human development, as natural determination reshapes and reorganizes what might otherwise be thought of as specifically human existence.²⁸⁸

This is only possible because man is a development within nature: What distinguishes her i.e., what makes various groups of humans different within nature (but not separate from the rest of it) is an integrated complex of capacities, aptitudes and practices that not only transform various aspects of nature, but that remake immediately surrounding nature by constructing a specifically human world (an ensemble of instruments, techniques and practices directly mediating the relation to nature, material artifacts extending though without necessity to built environment, a universe of ideational and symbolic constructs) in which those groups are embedded. In the decisive evolutionary sense what is "pre-man" (in other words, hominid) becomes man through specific reproductive activities that entail a world forming self-making in relation to the immediately surround natural world... It is the construction of a world that man distinguishes herself from other forms of being in nature... In, through and on the basis of said activity man becomes herself, becomes humanly natural. This is merely a formal determination (which has been elaborated by working through the conditions for the emergence of man). Yet, even after she has fully emergence, man has remained natural and not just in a formal sense, but in a substantively as well, a situation which she is nonetheless capable of going beyond: Elements of domination that first formed as social relations in animal, i.e., primate, communities have been retained, or (as the case may have been) overcome, but in any event have decisively and universally emerged in human history.

²⁸⁸One very excellent instance of this relation is brought forth by Richard Manning (*Against the Grain: How Agriculture has Hijacked Civilization*. New York, 2004: 40). We shall cite at length:

"As with many inherited diseases, the occurrence of sickle-cell anemia varies by ethnic group, but it is particularly common in those from Africa... what we regard as a disease is an adaptation... Sickle-cell anemia confers resistance to malaria, which is to say, if one lives in an area infested with malaria, it an advantage, not a disease; it is an aid to living and reproducing and passing on that gene for the condition... the results of analysis of human DNA and of the gene for sickle-cell anemia [indicate the] gene variant common in Africa arose roughly eight thousand years ago, and some four thousand years ago in the case of a second version of the gene common among peoples of the Mediterranean, India, and North Africa. This revelation came as something of a shock for people who thought malaria to be a more ancient disease. Its origins coincide nicely with those of agriculture, which... is no accident. The disturbance – clearing tropical forests first in Africa, and later in those other regions – created precisely the sort of conditions in which mosquitoes thrive. Thus, malaria is an agricultural disease."

The Appearance of "Spirit" *Modern Man, Her Specificity and Her Place in Nature*

Human characteristics... an upright posture, speech, the production of instruments for specific tasks involved in social reproduction, hierarchical social organization as it existed prior to human development... were the consequent of an integrated complex of practices, suggesting that man (in both known lines of her development) was self-made, her appearance a product of her own activity of becoming... This should be qualified: The complex interpenetration and multiple determination of activity, biology, technique, nature (climate) and social relations does not just characterize anatomically modern man but is the central feature of hominid development (including archaic *Homo sapiens*) as such. In this sense, earthly nature and humanity have *co-evolved* since the first appearance of the hominid genus *Homo*... Just as anatomical evolution did not precede social (cultural) and technical development, and just as it did not drive species development, the transition from animality to humanity was not a linear process. It had a multifaceted, ambiguous character. That transition occurred *at various times and places with no single feature marking it*. It is impossible to specify speciation within the genus *Homo* strictly on the basis of anatomical evidence: All these forms and practices of self-making were present... but here it was weighted to one, bipedalism or dance, speech or work, etc., there it was weighted to another, social organization or bipedalism or speech or work and tools... within or without the context of environment processes and events (resource shortages, rapid climatic transformations, cosmological perturbations, etc.). All were all *simultaneous and recurrent* developments.²⁸⁹ This brings us to modern man, whose appearance in geological time can be placed at roughly 45,000 years ago.

She appears with the elaboration of systematized, articulate speech, with language that, in principle, is self-referential, self-enclosed: This elaboration proceeded by way of the *detachment of sound from bodily envelopment, from contextualization*, not just from the intuitive (perceptual) recognition of the unity of things, but of the thingness of things (intuitively grasping and understanding "reeness" as opposed to this or that strand of trees against the background of which it has been apprehended), thus to the objectivity of objects, this resting on and forming the intersubjective (i.e., social) constitution of ideal meaning, ideality (here, words embodying meaning distinct from their referents). Now it is this non-spatial meaning or sense, ideality (concept, universal), that is apprehended through naming and which can be reflexively grasped as such: This intuitive grasping is the "seeing" of the "thing," constitution of universality as ideality, as meaning, all of which is a precategorical act, an identification of the thing as such, founded on that perceptually unified field. Language and ideality, conceptual thought so understood, is apparent in the sophisticated hunting artifacts, in the soft hammer technology, in jewelry and in cave wall art with all its symbolism that begin to appear from this date forward... Only with language does *fully symbolic thought come into being, and it does so in order to mediate the practice of daily life ... and here we intend "mediate" in the intertwined senses, first, in which Spirit in and of itself is largely, not entirely, powerless and dependent on the "lower" forms for its efficacy, to materialize (objectify and realize) its intent; and, second and simultaneously, where "symbolic" thought constitutes a social imaginary that not only frees us from the pressing bondage of vital constraints but implies a practical capacity to direct and energize diverse social activities*²⁹⁰ ... Herein lies Spirit's autonomy, in a capacity for action that however is limited to human interaction based primarily in speech, in argument and persuasion... where directing social activities is oriented to practice, to comprehending and explaining the world in its totality (i.e., the meaning and significance of the cosmos and the role of humanity in it) and its specificity (i.e., us, family and kin, social group and our situatedness in the community and nature), thereby illuminating and organizing that practice. From this moment forward, the explication of the role, function and content of this symbolic thought in the life of a community of humans is an integral, necessary part of reconstructing the contours of that social life.

²⁸⁹Thus, we do not privilege work (labor) in this regard, even though it is in and through the activity of work on, say, stone tools (e.g., choppers, hand axes) that, in creating instruments to mediate between need and the object of its satisfaction, a simple representation absent the need (suppression) slowly rises to an image of a typical shape that can be set to a regular pattern (i.e., reproduced on demand), a regularity that can be seen in the archaeological record in sites where hominids produced stone tools. Through the suppression of need, work mutually mediated with speech ...passing through or "worked" over by speech ...generates ideality: In speech, in naming, sense (meaning), even if sensuously shrouded, is created.

²⁹⁰In nature other than in human interaction, the capacities of Spirit are limited to denial and canalization. There are many names for these two forms of "active" Spirit, the most common being "repression" and "sublimation," respectively. For example, see the discussion "The Production of Ideality" in Part V, above, which suggests that moment of the genesis of *Spirit*, undeveloped, that moment at which it began first to take explicit form.

In a formal sense, fully formed modern man has now appeared. From this moment forth, a distinctive and specifically human form of development occurring within nature can falsely be counterposed to animality (i.e., as an unnatural development entirely distinct from the rest of nature, what in fact is a humanly natural development): That formation takes place on the basis interaction with society and culture, an *actively formed world*, mediated to the human being first and foremost through family, band, clan, community, society, and it entails an unspecified relation to this world in its immediacy: All other forms of developed animal life experience a surrounding, made environment in terms of tugs and pulls emanating from it (which amounts to a perpetual "false consciousness" as those tugs and pulls are drive, impulse or instinct, mediated by an internally generated structure, a self-ordering behavior governed by biological goals of self-preservation, self-maintenance and self-enhancement of the animal that, as it were, constitute the field of animal activity, its milieu): Effectively, humans do not have an environment at all, and are absent *specialized* drives or instincts; rather, it is through activity and speech that human beings overcome this "instinctual deprivation" and, in remaking immediately surrounding nature, form for themselves a world, a cultural and material universe of meaningful symbols and use objects (such as tools) that constitute the components for the active reproduction of social life. Historical communities of human beings transform those "places" within the natural world within which they are situated (we can call this socialization identical with humanization), forming for themselves a socio-historical world, objective substance, duration and hence identity that allows them to stand forth and endure (if not achieve permanence) in the ebb and flow of becoming and passing away (in the infinite becoming forming natural movement within which humanity is situated). For humans, this is a constant practice of remaking the given, already humanized natural world, but as a moment of a total situation, this practice is a continuous process of change and reintegration, of the formation of novel, partial humanly natural milieus within earthly nature as a whole.

Nonetheless, extending from the dialectical causality of primordial metabolism and vital impulse in producing and renewing atmospheric oxygen that is a condition of their existences, through forms of animal life up to primates that organize societies within nature to man who produces a socio-historical world with a material substrate, *all making in nature is producing in the etymologically original sense of "bringing forth something new" on the basis of already existing material substances.* (It is a *transforming* of those substances.) In other words, there is no making in nature *including that of humanity* that materially *creates*, that brings forth real objective and sensuous substances from nothing. This means that all production draws on material strata that are *natura naturata*, limited beings (natures). In this respect, it is crucial and necessary to point out that the Earth is itself limited, its resources, minerals, its fossil fuels, its water, its breathable atmosphere can all be depleted without being replenished. All production entails, moreover, waste, not just resource depletion but pollution; all production is subject to the capacity of the ecologies of limited natures to assimilate pollutions and regenerate themselves. We have discussed this elsewhere.²⁹¹ Let's summarily recapitulate those features that set man apart as a humanly natural being.

First, a new principle of the self-organization of the being called man is characterized by reason or "*Spirit*." By this we intend not merely conceptual thought (discursive, logical analysis), not only the production of concepts and the intuition of essences (where they are not identical) in which the objectivity of objects is constituted and given as meaning, but also the capacity to represent situations to ourselves as other than they are, i.e., imagining, whether those situations are perceptual in the broad sense (e.g., visual, audio, etc.), conceptual (e.g., different, non-existent natural processes, social relations, institutions, etc.) or affective (e.g., sadness, envy).²⁹²

Second, an existential liberation from life, from nature understood vitally or from the organic world, is essentially characteristic of human beings. This does not mean that man is not incarnate or not subject to (inchoate and unspecialized) drive-determined needs, and affects as well. What it means is that human experience is based on a freedom from immediacy, and the ability to disengage itself from the pressures, of life. *This is a feature of a distinctive, novel form of being that is nonetheless part of nature, in nature, is nature and as such is humanly natural* precisely because, rising from socially constituted need and the

²⁹¹See *Capitalism and the Domination of Nature* (the Postscript to *The Critique of Science*), Part IV, the final footnote to "The Geophysiology of the Earth, VIII: The Uniqueness of Earthly."

²⁹²Noteworthy, perhaps, is what is missing in this analysis, for instance, certain class of emotional acts such as loving and grieving. They do not appear because that are not distinctively human; instead, behaviorally, all higher primates and many mammalian forms exhibit these emotions, and others such as remorse as well. This much said, the appearance of Spirit, a new order of reality we call human, reorganizes and integrates this class of emotional acts, i.e., places them on a new foundation, one unintelligible apart from this Spirit itself.

goal (telos) that is posited with it, *Spirit* and its activities (thought, intellectual intuition, analysis, imagining) mediate the relation of this being to the world, that is, *comprehend and explain it in order to act in and on it*.

Third, human beings can make an object of, examine without the pressures of life, ourselves in any of our partial, limited aspects as a vital, affective or conscious being. We are capable of objectifying any and all of our own physiological, emotional-psychological and cognitive states. In this respect, only human beings are capable of an explicit consciousness of self.

For animals (e.g., primates), an object is given and only exists indistinctly within its field of drives and affects, which is not detached from its sensory-motor awareness. Characterizing animal forms from "lower" to "higher," and among these different forms entailing qualitatively different capacities for genuine learning, we call this simple animal sentiment of self. For human beings, awareness is simultaneously consciousness of the object distinct and other than itself (not immanent to itself as awareness) and tacit consciousness of self. Because, for humans, the object (of awareness) is other than the consciousness for which it is present (which is another way of saying that it is not simply given as a function of drive and instinct, that is, its appearance in the field of awareness is not determined by its relevance to vital need), the object can appear as it itself: So, *fourth*, human beings are capable of strict objectivity, the determination of the objective nature of things. Inseparably distinct from this capacity, two further features appear with human beings as human, namely, the capacity to grasp essential relations, to distinguish the essential from the contingent, and the cognitively operative, fully developed categories of thing and substance.

As ideational, as "abstraction," the *empty* forms of space and time are not, though, originally distinctive features of humanity as such, categories with which precognitively and necessarily mediate *Spirit's* relation to the world. Rather, these categories rose as intellectual intuitions under socio-historically specific conditions: They singled out the relational nexus formed in commodity exchange as it first emerged in ancient Ionian society, taking shape as the underlying context in which the world, and beings and objects within it are apprehended. Recall that *Spirit* rises within Nature. As we have argued, *without embodiment there can be no development of Spirit, its realization would be impossible*.²⁹³ The empty forms of space and time, *fifth*, rise from uniquely and distinctively human features, a unified, a world space (which the animal lacks) and a dynamic temporality which, in turn, presupposes the preobjective, oriented space constituted by the human being as body subject (*leiblichen Subjekte*) and the lived time originally constituted in socially subjective (intersubjective) human doings. Because "man" is a humanly natural being, this time is fully integrated with natural cycles of the days and seasons (natural time). It is in this world space that all sensible objects are singularly related as an ordered field composed of distinct objects in their objectivity, on the basis of which the concepts of quality and quantity and number as well as all are initially, ideationally constituted, first appearing as "abstractions" on the basis of the practices collecting, counting, storing (grains) of priestly groups attached to the personages of kings in early tributary formations (e.g., Mesopotamia, dynastic Egypt, Sheng China).

A *sixth*, final characteristic of man is the production of a social and historical world, an interrelated and interconnected complex of tools and instruments, social relations, institutions, and idealities (concepts, theories, mythology, religion, science and philosophy) and sensuous-material structures ("built environment" even if it is only temporary construction as with nomadic bands) which objectified in and through this "complex" of "features" are formed in self-making that itself rests on remaking the immediately surrounding world of nature and humanized nature.

As a humanly natural being, it is these novel features of human existence that form new principles of self-organization, through which this being in actively appropriating its world, has restructured and reintegrated the "lower" orders of nature and existence (animal, vegetative) as they otherwise inseparably characterize it.

If one of these features that characterize man as a humanly natural being is present, they must all be present: They are not only interrelated, but none are possible without the others: In the relation between them there is neither linearly causality nor logical priority, just dialectical circularity. The genesis of all of these features can be shown (as we think we have) to *reside* in the activity of man as a practical, a sensuously active being. Characteristic only of modern humans, it is this "complex" of "features" objectified in a material and cultural, a socio-historical world formed in self-making that sets the self-making in humans that itself rests on remaking the immediately surrounding world of nature and humanized nature apart from the self-making of not just all hominid species including Neanderthals, but

²⁹³See Part V, "The Constitution of *Spirit* within Nature," above.

of all forms of life. Taken together, it is these features, Spirit, this objectifying activity, its realization in production of a socio-historical world and that world that characterizes humanity as a distinctive form of being in nature...

The foregoing in its entirety nonetheless remains a formal determination, a characterization of man in nature relative to other beings. There is more at issue, if perhaps initially only a question: What is Spirit in relation to nature as a whole, to the totality?

In all reality, human beings may be unique:

We as human are immediately dependent upon family or kin and social networks of others, mediately on humanized nature intertwined with objective substance (materialized productive forces, built environment, the complex of instruments and techniques on the basis of which social life is reproduced and sustained) and ideality (a universe of symbols, concepts and meanings including those constituting historical languages of groups of humans) that, mediating the development of objective substance, rises on its basis. Constituted as such as a distinctively human world, the unity of substance and ideality is the product of the work of prior generations. We, the living generation, appropriate that world (rarely revolutionarily transforming it) and, in that acquisition, we form our own identity (selfhood and personality): Those others are part and parcel of that very identity. Indeed, identity in the conventional sense itself is problematic: What we as human are simply is not given by nature, in nature, since we, even as nature, as humanly natural, always find ourselves continuously and actively becoming.

This fundamentally practical reality is evolutionarily-anthropologically grounded in our sensory-bodily constitution as human, and consequent upon our incomplete formation at the moment of our origins (birth with the lengthy postnatal period of initial humanization that follows). We, as human, are deficient beings who in our immediate natally given form are existentially helpless, creating a basic "condition" (we do not have a ready-made "nature," lack an innate moral purpose or compass, are not at birth uniquely fitted to a specific world, are absent specialized drives or instincts and a corresponding environment or milieu). Call this "condition" negativity: We are always already outside ourselves engaging in self-formative activity, and for that very reason are always other and more than ourselves in whatever immediate moment in our development at which we exist. Not only is this negativity at the basis of activity in and through which a world and our identities are formed, it compels us to generate a self-interpretation, one that extends from ourselves to our place in reality in its totality: As Spirit, we are beings whose existence is a question and riddle without immediate answer or a pre-given solution, condemned instead to make our existence and capable of doing so only through ideal mediation (formed through speech and language) that is present and given with (yet constituted in and through) our activities. All our efforts in the world (whether in relation to others, objects, institutions, nature, etc.) are and can be carried out in no other way than by forming a precognitive "view" of the world that orients us practically in this world: We are compelled to illumine our activity by producing a self-interpretation that, arising on the ground of daily practice, contains tacitly or explicitly a sense of the totality, that is, extends from ourselves to our place in reality in its totality (ourselves, the world we have formed in nature as humanized nature, and nature in its unending, atemporal becoming), activity in which and on the basis of which reality and totality, reality as the totality, is itself understood and explained from common sense to philosophy: We as human, as Spirit, always already, and necessarily, act on the basis of a determinate conception of reality and, inextricably bound up with it, a vision of the world we wish and need to create, sustain, or maintain. *Yet we need never elaborate this vision, we can even deny its necessity.*

Evolutionarily-anthropologically formed, Spirit simultaneously exists as actuality and as potential realizable only in historical time by concrete human groups. As actual, Spirit is that complex of intertwined, inseparably distinct features characterizing human reality. As potential, the realization of Spirit has two indivisible dimensions which constitute its substantial content. Realization is achieved in overcoming (going beyond) natural determination and natural determinism, in "absolute ethical life" (Hegel) or in forming and sustaining a genuinely human community; and in this achievement Spirit is (re)integrated with Nature, for a genuinely human community stands in conscious relation to the totality.

The shape of such a community, its substantial content, rests on communal appropriation of nature's largesse, and on horizontal and equitable social relations which affirm each bearer in the affirmation of all other members of the community.

A conscious relation to the totality is more and other:

Among the orders of reality, inorganic and vital with its manifold internal distinctions and gradations embodying life in its various forms whether as primordial metabolism, undifferentiated impulse, instinctual and habitual behaviors or practical intelligence, only the human order demands self-clarification and

forms such as self-understanding, one laying at the base of our activity, a self-understanding of ourselves and the totality, and in so doing only we, as human speak and articulate our place in the totality, says what the totality is and what our relation to it is, and how it might and should be. The totality is otherwise mute, silent. In this sense, we, as human, are unique all over again: Only we, as human, as *Spirit*, can speak for the totality of which we are part, but only insofar as we are part, only insofar as we have achieved integration with nature, only if we stand on the ground of genuinely human community. Otherwise, to the extent our own activity is "entropic" and not co-productive, we consume our own foundations. We abdicate speech about the totality while engaging a societal practice that will consume, that is, destroy, ourselves as well... In a tragically ironic prelude to our own extinction, we too would be mute... Only such a being, only we, can project how the totality in its earthly aspect might be ... because we must develop this precognitive vision of how it is and inseparably how it ought to be in and through our daily activity. Thus, in speaking for the totality (in particular, earthly nature as immediate expression of the infinity and dynamism that is the totality), we speak as part of it and in defense of it, and under penalty of abandoning and destroying ourselves we are obligated to actively preserve, maintain and enhance that immediate being, and the beings in their diverse and multiple interrelatedness that constitute that being.²⁹⁴

²⁹⁴We can, should and must ask: What uniqueness does humanity possess, what *raison* does it evince, if it, in particular revolutionaries, fail to speak, argue and fight for the totality in the face of ineluctable catastrophe, a mass species extinction unrivaled in the geological history of the Earth, in confronting the utterly unimagined disaster of a hostile new Earth, that the movement of capital is now generating? What role and function in the totality does humanity have if it abrogates this pressing urgent, and seemingly inescapable task?

*Free men are not debt slaves
They owe no man, party or institution anything
Whatever material accouterments they possess, they are theirs fully without
being mortgaged elsewhere.*

*Free men do not work for another
They do not have a master or a "boss"²⁹⁵
They do not in fact work, if that means anything other than producing for
communal self-sufficiency.*

*Like-minded, free men are always found living and acting together, absent
individual property rights and above all private property in production, without
the mediation of things or markets, as a consensus-based community in which
all are equals, where words above all else count, in which none lead or are led,
none rule or are ruled, none administer or are ministered.*

*Free men do not have "rights" nor do they defend a "constitution"
They need neither because they are not counted, registered and taxed
They are free because they are men without a state and no state holds power
over them.*

²⁹⁵The poor whites of the old South called the great planter "boss" because in doing so, they thought they avoided being brought down to the level of "his" slaves. Originating with New York northerners, etymologically "boss" is a corruption of the Dutch "baas" which, of course, means *master*. It was just denial, a bad faith manner of hiding from themselves the reality of planter mastery non-propertied whites lived and experienced.

***Archaic Communities and the Origins of Agriculture
Hierarchy and Social Division, Natural Determinism and Modern Man:
From the End of the Last Ice Age to Capitalist Modernity at the Moment of the Appearance of the
Modern Science of Nature (Second, Final Version; Full Text)***

In the following we shall explore a singular line of inquiry. Basing ourselves on global analyses of archaic communities and presupposing the analysis of both tributary formations and capitalist dynamics, and informed by what is particularly cogent, compelling, and veritable in these analyses, we shall exhibit the abysmal gulf separating them as free communities from civilizational social forms, above all capitalism. Our premises form, of course, a historical, dialectical and materialist perspective on nature and society in which society is integrated into nature, the only basis on which a critical assessment of whatever "truths" these analyses "possess" can rest; for it is only in and through critical assessment in this manner that the fullness of insight and understanding can be achieved. This demands a return to philosophy, a discourse not simply bound to reflection on the accumulated experience of the working classes of the world as the terrain on which all theorizing is conducted, a discourse which, when properly conducted, instead has already given itself over to sustained reflection on the totality of what is,²⁹⁶ a discourse which, finally, has once again been made possible by that unique standpoint created by our inextricable situatedness at the moment of simultaneous conclusion of two vast epochs in which our being and the limited totality (earthly nature in its geologically contemporary form) are at issue.*

The Question of Natural Determinism

Recapitulating the contours of *The Materialist Dialectic*, if by "society" we mean and intend a configuration of social relations, that those who enter into these relations are simultaneously shaped by and shape those relations in and through their activity, if we mean those same beings have no "nature" (e.g., a preconstituted moral center, instincts that decidedly dictate and control social behavior, a genome that does the same), but instead this configuration of social relations forms the fundamental structure of society, that, in the case of human beings, "man" is an "ensemble of social relations," then we shall quickly be compelled to admit that society reaches far back into nature, and nature far forward into society...

To grasp, known and really understand, i.e., to comprehend, "man" is to do so radically and that requires an account of her genesis and formation and not just a synchronic account of her constitution: This means that she must be understood anthropologically-evolutionarily as well as socially and historically, and it means a discussion of "pre-man," of hominid existence which in turn is informed by that of australopithecus, and this in contradistinction to animal societies. Said approach is not logical error, an infinite regress moving backward in geologically reconstructed time to earlier and earlier ancestors. Rather, it is an argument about what is specifically human about her, about "man." It is not society.

For, like man, an account of contemporary animal societies demonstrates, as we have shown,²⁹⁷ that the basic structure of animal (i.e., primate) societies is determined by the manner in which the group organizes itself (largely in and through activity, the activities of foraging, eating, child care and play), and not on the basis of, say, hereditarily grounded, dumb instinctual behavior. What we discover, further, is that where "nature" does shape society it is in the determination of the structure of those social relations, that is, in *hierarchical forms and inequality* (exhibited in dominant and submissive behaviors) which are consequent upon naturally given difference (almost exclusively on sexual dimorphism, the qualitatively larger size and greater weight and strength of adult males relative to females, and young) in some animal societies, e.g., baboons and rhesus monkeys; yet in other animal societies (among them some where sexual dimorphism obtains), e.g., chimpanzees, gorillas and bonobos, that structure is less to more egalitarian, i.e., it is not subject to natural determination.

²⁹⁶ *The Materialist Dialectic: Why the Study of Human Origins is Necessary and Why it is Indispensable to the Critique of Science and Inseparably that of Capital.* St. Paul, 2014.

²⁹⁷ *Ibid*, Part II ("From Man at Her Origins to Animal Societies"), "Animal Societies."

* Genesis of Capital: Formal Subsumption and the Bourgeois Revolution (St. Paul, Third Edition/Second Revision, 2019), Book II, "Forms of Sociation"; and *The Critique of Science: Historical, Materialist and Dialectical Studies on the Relation of the Modern Science of Nature to the Bourgeoisie and Capital.* St. Paul, Fifth Edition/Fourth Revision, 2019: the Interlude; *Capitalism and the Domination of Nature.* St. Paul, 2010: Part III in its entirety, and *Community and Capital.* St. Paul, 200: §§81-99.

We make a large assumption, but one which is compelling logically, and evidentially (i.e., is strongly suggested by social reconstructions based on material traces amongst different, extinct forms of *Homo*, *Australopithecus* and even skeletal remains of Miocene primates): The fundamental, variant forms of the structure of social relations among distinct genera, *Homo* (man), *Pan* (chimpanzees, bonobos) and *Gorilla* (gorillas), have been stable... thereby forming either hierarchical or egalitarian troops and communities... all the way back to that last common ancestor where in geological time these taxonomical groups first appeared as distinct genera, and with them the ancestors of modern man as well as those of contemporary primates.

Let us, then, turn to archaic communities of humans as those communities originated, and let's begin but restating the foregoing:

The Materialist Dialectic shows that among Upper Paleolithic hunter-gatherers in southern Europe some communities exhibited a soft stratification,²⁹⁸ indicating that social organization based in nuce on hierarchy and inequality, while others exhibited social equality; and the presentation as a whole suggests both forms of social organization reach back beyond *Homo* at her origins all the way to (paleontologically reconstructed) Miocene animal societies while reaching forward to contemporary archaic hunter-gatherers (as well as to contemporary animal societies, especially bonobos). The foregoing speaks to the origins, meaning and extent (and limits) of natural determinism in human affairs.

Human communities can in principle overcome *natural determination* and *natural determinism*, though the issue becomes complex and transcendence exceeding difficult (i.e., requires revolutionary remediation) once agriculture is established, fixed positions in a division of labor congeal and a state is raised on these foundations. Yet it was at this moment that, outside such socially divided communities, a countermovement first formed. That was archaism.

The question posed here is, "Within the overall historical framework of this movement, just how far or to what extend has archaism (with its refusal of labor, and the absence of production, an economy and a state) overcome natural determinism, i.e., societal hierarchy and inequality?"

It is this framework that is explicitly examined and this question that we attempt to answer in the following.

We have suggested that both hierarchy and natural determination characterized human communities (some, perhaps no more than those that didn't, perhaps many but certainly not all) during the entire course of human emergence (from *Homo habilis* through *Homo erectus*) down to the first appearance of anatomically modern man (*Homo sapiens*) some 110,000 years ago.

At the same time, in *The Materialist Dialectic* we have shown that there has been another, alternate "evolution," "line of development" or unfolding "process," call it what you will, one reaching back to animal societies and forward to "man" and one characterized by the absence of hierarchy and social division, a fundamental egalitarian community. And we have indicated this egalitarianism is intrinsically related to sexually promiscuity, especially among females (in animals, above all, in bonobos, the proper analog among humans being an undifferentiated, erotic inclination beyond narrowly genital sexuality) and the insignificance (and in some cases, the complete absence) of hunting (and thus meat eating) within these communities. So at the risk of being unduly repetitive, we wish to know if archaic communities carry the refusal of social division as far as a genuinely, naturally human embrace of freedom (negatively speaking, transcendence of *natural determinism*).

Natural Determinism and Equality in the Upper Paleolithic Run-up to the Formation of the State and the Constitution of Archaic Communities

Both hierarchy and social division to one side and egalitarian social relations and unitary communities to the other are present with the appearance of uniquely modern man (circa 45,000 years ago). In respect to the presence or absence of natural determinism, these two fundamental forms shape human society for the entire Upper Paleolithic down to end of the last glacial, and on its heels the appearance of agriculture where, with that appearance, social division is vastly accelerated and deepened by the formation of fixed positions in a sphere of production, a movement which based on the creation of social wealth in the form of material surpluses (grains) created a new inequality which, in turn, culminated in and was reinforced by the formation of the state.²⁹⁹

²⁹⁸ *Ibid*, Part VI (Neanderthals and Modern Man), "Expanded Concept of Consciousness."

²⁹⁹ We should be very clear on what we intend with respect to the term, polymorphous erotic inclination. Broadly speaking, there are a two issues here, one social and historical concerning the significance of the term, and other theoretical concerning its meaning.

Take each in turn.

We can tentatively specify the forms in which natural determination figures in (to one side or the other of) the boundary between "proto" human (various forms of Homo) and human as it, that boundary, is created and crossed: These are in sexual division and ideationally, the one itself a naturally deterministic carryover (albeit appearing in a new form), the other uniquely human.

Sexual division, a form of natural determinism arising from the social reproduction of species life, is not itself "natural" in the specific sense of simply given with any and all species development (again, as chimpanzees and bonobos in particular demonstrate), say as a function of sexual dimorphism. Among different forms of Homo, it is, however, especially pronounced among those whose diet is dependent upon meat consumption, that, in other words, heavily rely on hunting. Here, though, sexual dimorphism is decisive, for size and strength play a central role in forms of hunting wherein technical elaboration (the instrument as a weapon) is simple.³⁰⁰ Thus, Neanderthals. Within the context of the evolutionary self-making of communities of Homo which exhibit sexual division, the singularly and incomparably

Socially hegemonic forms of erotic gratification (in most historical forms of society, genital sexuality) are inseparable from the social context in which they appear. Thus, in the historical present narrowly genital sexuality is the normalized form of a monogamous relation that reproduces the bourgeois, nuclear family. This is case irrespective of whether "personal relationships" are heterosexual, homosexual ("gay" or "lesbian") or "transsexual"; for, determined by societal form which in turn is doubly determined by the logic and movement of capital romantic love), personal relationships are internally (in this case, its transmission through the familial form) and ideologically (i.e., determined by canalized desire for structured by relations of domination and subordination. (Thus, for instance, in homosexual relationships, whether man-man or woman-woman, invariably we find one "partner" adopting the dominant "male" role and the other the subordinate "female" role, almost in all cases committed to "lifetime partnership" as a "couple," for whether there are three, four or five "partners" during the course of a lifetime, the intent is always a "soul mate.")

Non-normalized, non-heterosexual relationships too are slavish and repressive; they certainly are *not* "liberated": *Literary interpersonal relations can only form in the context of a free society (community).* The significance of polymorphous erotic inclination, then, is socially and historically transcendent.

The other issue is the meaning of polymorphous erotic inclination itself.

Go back to *The Materialist Dialectic*, in particular its summation and conclusion laid out in *The Appearance of "Spirit."* Throughout and there especially, we have phenomenologically exhibited that "man" is evolutionarily self-made. Consistent with this perspective and bearing in mind the strictures to deployment of terms "phylogenesis" and "ontogenesis" (see *Ibid*, Part V, "Theory of the Transition from Animality to Humanity" at fn. 142), we shall suggest a brief elaboration:

The essential steps in distinctively and specifically human development do not, unlike most other higher mammals, occur in the foetal period of human beings. Rather, they take place after birth, especially during the first two years. This means, and this is crucial, that in a unique way, the development of a human being as a human being involves interaction with its society and culture mediated to it first and foremost through its immediate (extended, nuclear, etc.) family of kinship group. Unlike most animals, who at birth are released into their surrounding milieu with already specialized drives and are, accordingly, firmly directed to environments that are specific to their species (and are, thus, fully members of their species at birth), *human beings have an unfinished instinctual structure, possessing at birth drives that are unspecialized*; they are not directed to any group of objects that would make up a specific environment. This does not mean that human beings do not involuntarily experience impulses that inwardly emanate from organ or organ systems, or from vascular, muscular and nervous systems within the body as lived and experienced. What it does mean is threefold.

First, *such impulses are not firmly linked to a specific form of behavior that orient us toward, say, an encompassing milieu*, e.g., as in the case of alleged sexual, self-preservation, etc. "instincts." (Here one might recall the Donner party during winter 1846-1847. The settler party was immobilized and trapped by snow, and largely starved to death. Certain surviving members of the party engaged in cannibalistic activities as their overall situation deteriorated. Two of the members of the party, Indian guides, held culturally formed sensibilities that found them viscerally rejecting the eating of human flesh. Over time weakened from lack of nutrition, the two men continued to refuse cannibalism. They were attacked, murdered and eaten by the "white" settlers, products of Europe bourgeois societies. The vaulted "instinct" of "self preservation" is a culturally formed impulse).

Second, *such undifferentiated (or "dedifferentated") impulses, as it were, provide a vital, creative force: They are plastic*, i.e., they can be tied to any form of human activity be it aesthetic, belligerent, accumulative, or, of course, vital (e.g., food consumption). Impulses can even be yoked to their own denial as in religious asceticism. Impulses that are tied or yoked to patently social or cultural activities are said to be "sublimated," and such activities (of tying or yoking) conceived objectively (as a psychological "process") are called sublimation. Such impulses are, then, socially and culturally formed.

Third, these impulses can be consciously mastered, that is, even the most involuntary and automatized physiological processes can be rendered reflectively explicit and, on this basis, regulated. It is socialization practices in and through which an impulse, that is, a habitualized need and affect, structure, and on this basis an interrelated structure of habits, inclinations, interests, i.e., character, is formed in human beings. While needs and affects can change, can expand or contract, while their so-called spontaneous quality can be self-simulated or self-manipulated, the permanent outlines of impulses, needs and affects (subject to possible later transformation, sublimation, etc.) are formed in the very earliest "phase" of socialization, in early childhood.

human creation of a world of ideality, of concepts, systems of concepts (theories), mythology and religion can and does transform, further deepening and fixing, sexual division.

Sexual division is a form of social division; but it is not yet stratification: Simultaneously, it is and is not a hard division (i.e., it is not fixed in the same sense that positions in production secured by the state are, that is, social relations remain fluid, they have not congealed, they have not become institutionalized).

But It is a hard division because it is frozen to the extent it is intensified and heightened by ideal forms that justify and explain it. It is also "natural" though not, of course, as usually intended (i.e., it develops out of nature, where change and transformation is the rule, and not permanence which is an ideological prejudice masking power no matter how rudimentary). It is accounted for ontologically, particularly in archaic communities: The way-to-be of a community of people (most often formulated in myths of origin, of an ahistorical cosmological creation of the community springing from animist or anthropomorphic gods) is such and such, and in this being women have such and such fixed places. Thus, to overturn it, it would be necessary to overturn entirely the order of society. (This does not happen in unitary communities; they collapse and disappear first.) It is not a hard division because the community is not divided into antagonistic social groups, because no institution of institutions (the state) secures its structure as an organizing principle of the community.

Yet the stratification that characterizes statist societies is already latently present in any number of unitary communities, especially those which occupy what today features in the "sequence" (its late "stages") of the Upper Paleolithic. We can forgo a critique of stagism, and the grossly inadequate basis (in material technology) for positing as real a series of "stages," a sequence, in the Upper Paleolithic. But what we can note that the presence of a shaman,³⁰¹ effectively a priest with otherworldly or transcendent powers that place him beyond the control of the community, already constitutes and concentrates in his person the nascent, earliest shape of individuals who formed the thin bureaucratic layer (priests, armed men, and tribute collectors) attached to an overlord, the first form of the state. In some respect (i.e., its ideational depth, its stranglehold on the consciousness oriented toward daily activity of the individuals), sexual division at this moment in the totality of human history is more insidious...

Is Agriculture at its Origins Problematic?³⁰²

At least since the time of Gordon Childe, archaeologists and anthropologists (or those who operate on materialist assumptions) have held that man began to distinguish herself as a being in nature from the rest of that nature (animality) with agriculture... Only capitalism sets in motion a series of reflections for which man appears apart from nature... For, in agriculture, man produces her own subsistence, no longer directly depending on nature's largesse.

Does agriculture, in fact, merit this distinction, as that activity through which man originally began to form herself as *humanly* natural? Or is there something else entirely different or other, nay opposite, at issue here?

The classical model for properly socialized adults in contemporary societies of capital, of course, refers us back to the childhood, Oedipal situation. The classical nature of this model already presupposes as established fact the hegemony of the bourgeois, i.e., nuclear, family in society. The emergence of new forms of personal relationships based on narrowly genital sexuality have their origins in social devolution rooted in the longterm, historical contraction of capitalism (its last period of expansion having ended in 1971, the collapse of Lehman's in 2008 being a nodal point in this contraction).

What is crucial in this account is the *plasticity* of the unfinished "instinctual" structure, that is, the entirety of impulses, affects and needs that are formed and take specific shapes through socialization (effectively identifiable *communal forms of interpersonal relationships that most adequately achieve this enhancement*. "Instinctual" behavior characterizes most all forms of animal life. These forms experience their own drives and impulses as tugs and pulls emanating from their surrounding environment. "Instinct" constitutes an active relation between drive-projected object, the object itself and the structurally changing relational field of drives and affects as they form sensory-motor awareness, what we call animal sentiment of self.

³⁰⁰In a dialectically circular manner sexual division is not only *not natural*, it is not immediate and direct, i.e., evolutionarily it is mediated in *Homo* communities engaged in hunting by power, by social relations of superordination and subordination which are gendered, based.

³⁰¹See *The Materialist Dialectic*, Part VI, "Expanded Concept of Consciousness."

³⁰²Besides the sources cited below, the following works have also been helping in shaping our thinking as expressed in this section: Thomas Blackburn, and Kat Anderson (eds.), *Before the Wilderness: Environmental Management by Native Californians*. Menlo Park (CA), 1993; Hélène Clastres, *The Land-Without-Evil: Tupi-Guarani Prophetism*. Urbana (IL), 1995 (1975); Brian Fagan, *The Long Summer. How Climate Changed Civilization*. New York, 2004; Richard Manning, *Against the Grain*. New York, 2004; and Florence Connolly Shipek, *Pushed to the Rock: Southern California Indian Land Tenure, 1769-1986*. Lincoln (NE), 1987.

If we go back to the vast change envisioned in the movement from "Upper Paleolithic" hunting and gathering to sedentary agriculture otherwise known as the "Neolithic Revolution" (a concept rightfully associated with, again, the name of Gordon Childe), we arrive at one of the nodal points of simultaneous transition and transformation on the basis of which a universal scheme of historical development must be established. But it is precisely an analysis of production, society and culture at this moment that demonstrates that such a schema cannot be constructed.

What can be shown by careful, detailed analysis is that, for example in the Middle East where agriculture first originated, at different times in different places various, *some but not all* social groups moved from nomadic activities based primarily on hunting to sedentary communities engaged in hunting, fishing, gathering, and various degrees of what we shall call proto-farming.³⁰³ The content of these activities differed markedly as one community hunted larger mammals such as antelope, other small mammals and still others hunted water fowl, fished or both; different plants were cultivated among the primary ones emmer wheat here, barley there. The relation of each of these activities to others varied, as did that activity which was determinant for each community. Neither can be established in advance: There was no single series of "stages" or "phases" of this development that each community went through, as specific "stages" or "phases" appeared in some communities and not others. In the language of contemporary archaeology, there were several different "sequences" that are apparent, yet no singular one can be constructed³⁰⁴ ... A few communities moved toward a full, practical commitment to agriculture as such, while others continued to engage predominantly in hunting and gathering, some with very limited farming. Even as trade among various communities developed and became extensive, some communities coalesced synoecistically,³⁰⁵ others remained small villages; the size and scope of familial groups varied considerably, forms of communal living and architecture exhibited some common yet no pervasive much less universal patterns. Some communities retained hunter-gatherer practices associated with shamanism and a relation to an animal spirit world, others related to a worldly transcendence that was at once made up of only a few important animal spirits and was in part anthropomorphized, still others worshiped a pantheon of anthropomorphic gods.³⁰⁶ If one idiotically insists on a scheme of historical development, then one should also come to understand *a vast cultural and symbolic change (manifest in parietal art, in the symbolic significance embodied in tools and utensils, figurines and statues, by way of carving and painting, and evidenced in residential configurations, constructions and materials, etc.) preceded in the stratigraphic record the appearance of both tools deployed in and the material residues (emmer, einkorn and rye seeds) of agriculture.*³⁰⁷

Not only did agriculture originate at vastly different times (ranging from 10,000 to 3,000 years ago) in different places in the world independently of each other (in the Near East, in the basin formed by the Yangtze and Yellow Rivers, in east-central Africa around the Ethiopian plateau, i.e., the Upper Nile region, in the central Mesoamerican highlands, in the foothills to the Peruvian Andes, and in what is today now the east central United States), in the fertile river valley between the upper reaches of the Tigris and Euphrates where it first appeared, as well as throughout the Middle East and in Europe and elsewhere, sedentarism was necessary and decisive condition for its emergence, while in the central Mexico sedentary communities did not precede agriculture, but only appeared 2,000-3,000 *after* it originated.³⁰⁸ The whole concept of a Neolithic Revolution is itself suspect: In the Near East as in Europe, Upper

³⁰³Farming here does not have the meaning that it will acquire in the epoch of capital's formal domination over labor in production, where it is distinguished by production of surpluses for a market in opposition to peasant activity which aims at self-sufficiency. Instead, farming at the beginning in the vast epoch which agriculture at its origins largely defined has this sense: It is distinct from swiddening in that those practicing it were not nomadic, and in that they paid careful attention to the cultivation of novel plant forms and the techniques developed in this cultivation. At the same time, those who farmed differentiated themselves from agriculturists in that their form of life did not depend strictly on this activity (they also pursued hunting and gathering) and they did not aim at the production of surpluses.

³⁰⁴Jacques Cauvin, *The Birth of the Gods and the Origins of Agriculture*. Cambridge, 2002: 76, 96, 199.

The same absence of any identifiable sequence of development characterized the entire Northeast African region of settlement, inclusive of Lower and Upper Egypt, the Eastern Desert (i.e., that between the Nile and Red Sea), the Western Desert (eastern Sahara), Khartoum and Nubia as a whole. See Beatrix Midant-Reynes, *The Prehistory of Egypt*. Oxford (revised English edition), 2000: 69-166.

³⁰⁵The concept of synoecism, etymologically ancient Greek in origin, refers to the social process in the Middle East in which villages or towns came together to form a city that hegemonized the surrounding "countryside," a process largely coterminous with the historical origins of urbanization and rudimentary state formation.

³⁰⁶Steven Mithen, *After the Ice: A Global Human History, 20,000-5,000 BC*. Cambridge (MA), 2003: 66-67, 89-90, 92-96.

³⁰⁷Cauvin, *Ibid.*, 7, 20, 6

³⁰⁸Donald O. Henry, *From Foraging to Agriculture: The Levant at the End of the Ice Age*. Philadelphia, 1989: 230.

Paleolithic hunter-gatherer bands increasingly, especially after 20,000 years ago, exhibited characteristics of the earliest agricultural societies, sedentarism implying village life; growing demographic density; tacit hierarchy manifested by grave goods (huge collections of beads, fox pelts) at some burial sites that suggest tendentially a "soft" stratification. (Other burial sites exhibited no such accumulation of grave goods, and thus suggest unitary or weakly stratified communities.) This is, moreover, especially true of later sedentary archaic populations in some parts of the world (which tenuously justifies the otherwise, mistaken view that archaic communities were a "stage" preceding agricultural societies, affirming as valid a scheme of universal historical development): Among the American Indians of the Pacific coastal Northwest, those of California and the peoples of the Siberian southeast as well as among those who settled along the Atlantic coast between the St. Lawrence and the James Rivers, for example, not merely did sedentarism suggest village life, but communities had become large scale societies (in the pre-modern sense), a certain amount of social wealth circulated and was concentrated in a small, single stratum; important hierarchies encompassing slavery existed and societal differentiation had produced strata of nobles and commoners; not only did these societies gather and cultivate certain plants, in fishing (salmon comes immediately to mind) or collecting (acorns and other nuts or fruits) they then massed all of them during seasonal abundances, and preserved a stored quantity that was sufficient to assure subsistence for the rest of the year: These groups lived from their subsistence stocks during the winter months, just as all cultivators of cereals lived off grains stored in their granaries during non-growing seasons.³⁰⁹ But this is just one form in which archaism was historically constituted, not the primary one and in a strict sense not one at all, since it was were much more a transitional form of human sociation, a highly stratified society (not a unitary community) in the process of becoming...

The problem is not to demonstrate how agriculture as a radically new departure so-called was possible, thus how a radical (i.e., hierarchical and inequitable) form of natural determinism in human affairs came into being, but merely to exhibit that among hunting and gathering bands, there were some that gave up nomadic activity and became sedentary communities engaged in hunting and gathering in which this collecting give rise to a form of remaking of the immediately surrounding nature with a view to a reliable source of edible, medicinal and cosmetic plants, which, in turn, pursued in a systematic fashion became a primarily activity while hunting became entirely secondary. In this manner, the development of agriculture as historically actual was constituted in a series of social practices that retrospectively appears as an imperceptible process... We shall trace out this development below...

Archaism did not, on the other hand, appear everywhere in the form alluded to above.

Today rapidly disappearing as such, "pure archaic" groups, i.e., nomadic and stateless peoples existing without subsistence set asides, have sustained themselves longer than any other in humanity history, and can still be found in the most inhospitable climatic zones of Earth. The *San* peoples of arid regions of southern Africa (especially the Kalahari) are perhaps the last of a line of hunter-gatherers that can be traced back to the very origins of modern humanity, some 110,000 years ago. The aborigines of the desert Australian interiors have continuously occupied this land since it was first settled roughly 35,000 years ago.

But archaism existed in another form, that of sedentary communities of stateless peoples who also sustained themselves without subsistence set asides. Down to the historical present these peoples have been found, above all, in the tropical forest zones along the equatorial regions of the world, but also, for example, in the four thousand years of climate change (deglaciation) that ended with the Younger Dryas in the verdant zone between the coastal eastern Mediterranean and southeast Turkey, in the Jordan Valley and in the Euphrates Valley, and, again, after say 1550 in the modern era, that is, as the horse brought to central Mexico by the Spanish conquerors made its way northward, they also could be found in the plains regions of central North America in a truly remarkable achievement of stateless, sedentary social life.

More than any other form of sociation, it is the existence of sedentary archaic communities found across the world, concentrated in the zones of greatest natural abundance and dating from the modern capitalist epoch well back over 10,000 years, which renders the concept of a universal scheme of historical development false: If they were not exactly novel and revolutionary (i.e., their absence of labor, economy and state reached back to egalitarian nomadic bands, their sedentarism was new), it has been their mere existence (the inability of agricultural tributary social formations to assimilate them) that, in contrast

³⁰⁹Alain Testart, *Les chasseurs-cueilleurs ou l'origine des inégalités*. Paris, 1982: Introduction and passim; and, in its entirety, K.M. Ames and H. Maschner, *Peoples of the Northwest: Their Archaeology and Prehistory*. Seattle, 1999.

to agriculture, makes it necessary to account for the origins and development of the latter without reference to any historical schematization.

Power and Agriculture

What is really important here is the appearance of hierarchy predates the appearance of humanity. We understand that some of the nomadic human bands that first appeared in the Middle Paleolithic were softly stratified, so that hierarchy and social inequality, i.e., natural determinism, stretch far back into very becoming of *Homo* and still further. But set these groups aside. Starting from *unitary* (socially undivided, egalitarian) communities, once hierarchy reappears this side of human origins, it did so slowly, leading to fixed social functions, then to congealed social relations of command and obedience that characterized the activity of different social groups in all decisive social contexts, all ...production, rituals and ceremonies, consumption and leisure, forms of exchange... inextricably tied to one another. It is this, the latter, a "development" from unitary nomadic groups and bands to socially divided communities that we must account for, and this, to begin, requires a theoretical and philosophical explication and detour.

Relations of command and obedience, Power in its most primitive form, predated the appearance of material surpluses, but once the latter appeared Power and those surpluses were (and have remained) inextricably tied together. It was on the basis of the activity of farming... of its development (neither lineal nor dialectical) over centuries, a development which beginning with a set of different activities (hunting, fishing, gathering and plant cultivation) devolved into a sustained productive and subsistence strategy where human populations became existentially dependent upon agriculture to reproduce themselves and aimed at such in order to create *reliable material surpluses*... that those surpluses first appeared, however inconsistently from year to year. And while farming in some places remained the same for millennia (e.g., among communities in the highland elevations east of Lake Victoria and north of the Serengeti Plains) and never gave rise to any further "development," one type of subsistence farming in particular has always been conducive to an accumulation of surpluses albeit not reliably; in fact, in the seasons when it occurred these were "large" surpluses relative to mere subsistence and to, in a really crude and abstract manner, the sophistication of technical development. It is grain (wheat, rice, maize) cultivation.

Once these surpluses were produced and stored, then accumulated, social relations of command and obedience harden into societal stratification. The group that controls, later appropriating these surpluses, becomes separate, setting itself over and against the rest of the community. Once it has force at its disposal to ensure that control, rudimentarily a band of armed men, it has fully separated itself from the community: We can say that it constitutes a separate power, a state...

Now in Marxian theory there has been little or no effort to think through the relations of separate power (Power) to agriculture at its origins.

In the theoretical (encompassing Marxism) and, in particular, the explicitly philosophical traditions of the West, Power is exclusively understood as *coercive force*. This understanding is not abstract, that is, is not confined or concerned with isolated individuals or their interpersonal relations. While it grasps even these interpersonal relations as social relations (not as person to person relations which, obviously, are a form of sociality), it recognizes the social relations the underlay Power as those of groups of persons in their manifold daily transactions as they reproduce the entire social order (that is, as they interact in production, ceremonies and rituals, in the polity). These relations are understood, and this is merely understood, taken for granted or assumed as a matter of course, to exist not just in an organized form of hierarchy, but as stratified relations of unquestioned command and obedience between social groups (and individuals "within," i.e., forming, these groups).

Power as it is known in the theoretical traditions of the West has an object, the right ordering of social relations among men, an ordering that in the logical sense creates stratification. (Here, logical refers to an ideal or theoretical account of the genesis of this ordering, and is counterposed to, because it acknowledges the primacy of and difference between it and, the actual social and historical genesis of stratified order.) But this only becomes an issue when objective differences between men exist, where objective is grasped in its primordial sense, as that which immediately (i.e., perceptually, sensibly, that is, visible, tactually, audibly, etc.) stands out, over and against, thus separating men from each other. Objective differences in this primordial sense, then, means material accoutrements, where once again those accoutrements are elements or products of interaction that reproduce the entire social order, or that which counts and socially circulates as wealth, wealth starting from the accumulation of reliably produced material surpluses.

So in the theoretical traditions of the West, Power and material inequality are inseparable: In several versions (ancient aristocratic à la Aristotle, modern liberal), material inequality is simply given with sociation as such (occasionally by way of appealing to the unequal endowments of necessarily unequal individuals as a substratum of a human nature), in another (Marxist) Power follows from material inequality (or in its more sophisticated formulations, their relation is dialectical, appearing simultaneously, each, as it were, calling forth the other). But in no version has the relation been anything other than asserted. We intend to rectify this deficiency with a preliminary account of the manner in which the relations between reliable surpluses and their accumulation, material inequality, and Power developed. In the same traditions, Power is understood as the state, as a separate sphere set off from the rest of society. This separate sphere (whether embodied largely by a single personage and perhaps his retainers, or institutional in which case it is a historically late development) has been called the political. It is *coercive political power* because it rests on armed force. In its most primitive form (with which we are concerned here) this force is a body of armed men. But this separate power was not the product of an abrupt revolutionary transformation; it was, rather, slow to develop, perhaps even, as it occurred, not obvious if not imperceptible. It took place on the basis of the development of agriculture...

Farming entails plant cultivation (including limited plant and animal domestication) but, in its earliest forms, also a reliance on gathering, and as well as any of the following, fishing, trapping, the hunting of small game, and seasonally that of larger mammals (e.g., antelope). Agriculture, on the other hand, distinguishes itself from farming to the extent that it aims at continual production of, and as a practice is actually capable of producing, *reliable, preservable surpluses*. Yet at least at its origins agriculture cannot be understood in immediate opposition to farming, cannot adequately be understood simply as full time crop cultivation and what that entails. Agriculture, first, presupposed (everywhere but in central Mexico) and involved permanent settlement which *already* (before it was ever introduced) pointed to a more or less total reorganization of social life (one that entailed spatial concentration and collaborative labor); second, the occupation and cultivation of a well-defined territory (both the social space of the village community and the land on which seed was planted and crops harvested); third, domesticated plants; fourth, an existential dependency on crops to the exclusion not just of hunting, but to that of an essential reliance on wild plants, seeds, nuts and fruits where at best the latter were merely supplementary; and, lastly, an ideal-cultural (*geistige-kulturelle*) life that centered on the unchanging seasonal cycle, and not just planting and harvesting but a form of transcendence that organized the life (and death) that transpire within its cyclical contours, and refers us back to the, speaking pejoratively, "mythical" conditions of origination of settled social life.³¹⁰

Where and when it occurred (and its occurrence was extensive), the break with nomadic bands engaged in hunting and gathering and the appearance of a settled sedentary social life which formed the basis for agriculture was a response ... mediated by a consciousness of an immanently transcendent, animist spirit world and the human grouping's relation to it... to warming induced climate change, to the onset of the current interglacial. We can sketch out the climatic conditions in which sedentarism and agriculture came together.

By 14,000 years ago, forests had already begun to appear across Europe, and parts of the Levant where oak forests were particularly important. These forests grew rapidly (in the relative sense that each species of tree was capable of rapid growth) during a long period of ample rainfall. As we shall suggest in somewhat more detail in the following section, the new fauna that appeared with the climatic warming created the opportunity for this major shift, one of the most important in the history of humanity, to a settled social life. In the Levant, for example, just west of the upper Euphrates in present day Syria, groves of oaks and pistachios grew. These, along with fruit or seeds from plum, hackberry and medlar and the grains from wild wheat and rye, and the meat from slaughtered desert gazelle that fed in the verdant grasses near the river valley in the spring and early summer (and perhaps among villages nearest the river, fish and waterfowl also), all provided a real abundance of various food sources. Here, though oak acorns were by far the most plentiful, even copious. Acorns are an excellent food source (about seventy percent carbohydrate, five to twenty percent fat, another five percent protein), and where abounding will support fifty times greater (perhaps more) population densities than those of nomadic

³¹⁰E.g., among the earliest proto-agriculture villages of upper Mesopotamia, this ideal-cultural life was focused on dead ancestors as custodians that might arbitrate between varying, unpredictable nature, the extra-natural, "spiritual" realm and the daily world of the present. By the time agricultural, tributary societies had fully formed, this symbolic mediation of social life had been transmogrified into a dependency upon temple-based, divine kingship (inclusive of a pantheon of gods and goddesses) as the intermediacy that interceded on behalf of the living with this otherworldly Power to secure the conditions of productivity in agriculture.

hunting bands that traversed this region at the end of the last glacial. But acorns, like many other sources of nutrition some similar and others not (most importantly, wheat, rice, maize), have to be processed, perhaps not as extensively but processed nonetheless. With acorns and similar food sources, it is a question of shelling, pounding, and soaking (to leach away tannic acid that otherwise renders their meat inedible), then cooking.³¹¹ This takes long hours of daily labor, and it was women of the settled community who were committed to these tasks. *Right here, a lasting encompassing, existential determination of humanity was originally established with the advent of a form of settled social life, as (i) labor-become-life's determinant, as (ii) a socially-productively based gendered division of labor as the ground of the first, a "hard" stratification in history was firmly instituted, and as (iii) demographically dense communities all appeared for the first time in history. This is one path, and not the only one that, humanity took toward settled social life.* It set the stage for an agriculture that would transform this social division, broadening and even hardening it further. But, as we said, it was not the only path. Elsewhere and perhaps somewhat later but nonetheless independently, especially in the tropics, settled social life, permanent communities, would appear, similarly but based on an abundance of plant life, small game, waterfowl and fish. But there, that abundance would merely require a modicum of labor, and would give rise to a novel form of sociation as such, one that one emerged in opposition to precisely the development that this other tended toward, hierarchy, labor and production, an economy and, above all, a state. Here, though, in the Levant at that moment just prior to the advent of agriculture, utilization of an abundance of resources to be found naturally demanded extensive labor, a qualitative greater expenditure than anything humans had previously even known, labor creating, as it were, a daily sphere of production. Here, this labor mediating abundance would permit a larger village population that, for a time, would flourish, but would also be closely bounded (in the micro-geographical sense of mutually infringing, non-formalized communities' grass lands, tree groves, water access). The overriding climatic condition here was, as we have already hinted, a period of substantial rainfall.

The Younger Dryas introduced considerably cooler, and dryer conditions, in some cases drought. Communities that had still engaged in regular hunting found their "space" contracted as water sources dried up and animals moved elsewhere in search of water. Some communities may have already been marginal. They probably disbanded, some families returning to hunting and the mobility it afforded, others joining kin in distinct villages with better resource bases. Those groups with greater resources didn't obviously abandon their communities, but they were compelled to more systematically cultivate their wild plants sources, and to further pursue animal domestication (sheep, goats). Where drought was a growing problem, preservation, maintenance, and expansion of plants resources, domestication, farming, and in the end agriculture was the long-term solution pursued, not consciously at least at first.

What transpired was that construction of complex forms of irrigation became increasingly necessary. Irrigation mobilized men and women en masse even before reliable surpluses could be accumulated. Irrigation first and foremost, then storage facilities, men assigned to keep a watchful eye on the granary, other men, hunters now also warriors... all implied tacit command, embryonic "leadership," blossoming Power... Initially, this leadership in any number of cases may have been benign, based on elders, or more formally a council of elders, who, above all, knowledgeable in the ways of the community and about natural patterns of rainfall, plant care and animal behavior, were uniformly respected and oversaw irrigation "projects"³¹²... To boot, a precedent has been set as the mass of the community labor (in the first instance of this kind perhaps largely voluntarily) was deployed in construction (witness the fortification or water barrier, as the case may have been, unearthed at Jarmo, a farming village circa 10,000 years ago). When wetter, warmer conditions returned at roughly the same moment (2-4 centuries in excess of 10,000 years ago), social wealth, prestige and rank, manifest and materially embodied in clothing, ornaments embedding precious substances (e.g., gems) and other accoutrements, which first tententially appeared among Upper Paleolithic hunter-gatherers in the Middle East and Europe, had now become characteristic. Functional differentiation of tasks was now very close to stratification, to fixed positions in production and the community. These developments moved in lockstep with the pace and tempo of crop and animal domestication, and at this point were amplified by any growth in surpluses. At the moment the community went over to the pursuit of reliable surpluses (i.e., agriculture) as the dominant manner of socially reproducing itself (at the bequest of, cajoling by and pressure from simple, undeveloped Power), stratification had already appeared, social relations in production had hardened into social relations of domination, one group had nascently set itself apart from and over the rest of the

³¹¹A similar situation obtained in the central Sahara (Western Desert) circa 6,000 years ago. Midant-Reynes, *The Prehistory of Egypt*, 71.

³¹²Murray Bookchin, *The Ecology of Freedom*. Paolo Alto, 1982: 12, 74, 80-82.

community, controlling and later appropriating the (bulk of the) newly generated surpluses, and trade among communities (or between them and nomadic hunting groups, e.g., grain for obsidian) had become important (not for the least reason that domination by a single, small group was a further means of setting itself apart and atop). All these developments were reinforced around 6,000 years ago as rainfalls, especially in North Africa and the Middle East, diminished, as once again climate slowly became dryer and slightly cooler, compelling those agricultural communities now fully dependent upon crops to husband their water resources more carefully. This, in turn, bolstered social hierarchies that were able to enforce water conservation measures and who organized crop watering activities (construction and maintenance of ditches, drainage, catchments, etc.). We would note in this regard that it was about 6,000 years ago that nascent *divine kingly* Power appeared in Mesopotamia and Egypt... Agriculture, of course, was not the only possibility of sedentary social life, and it is here that the relation of Power to agriculture can be posed in another manner...

In the traditions of the West archaic communities are largely ignored or dismissed as primitive (i.e., socially immature or undeveloped in the unevidenced, uncritical sense).³¹³ Why?

First, because they do not conform to our notion of humanity, one for which we are compelled to labor, to engage in production in the sustained sense and at great personal cost, production and labor which have become perversely and ideologically elevated and ennobled... Even at the onset of modern times, Europeans, aspiring conquerors of a "new world," were shocked, dismayed and disgusted to confront healthy looking, robust humans, mere savages, who, basing themselves on a lush abundance of animal and plant resources, engaged in only an utter minimum of work.

By way of contrast, the archaeological record... skeletal remains and dentition... conclusively demonstrates that agriculture at its origins was (and for mass of people still is) very difficult work indeed: It produced a surge of new infections and diseases, some rooted in chronic malnutrition endemic to agriculture at its origins and throughout most of its history (to its sedentary large population groupings and to the synergism between infection and malnutrition), others rooted in disease carried by domesticated animals;³¹⁴ the mean age of death dropped precipitously with the embrace of agriculture; and over several generations activities made necessary by sedentary agriculture (such as preparing grains and nuts for storage) produced misshaped hands and toes, deformed lower backs, arthritic joints, malnourished and stunted individuals relative to hunter-gatherers, a physical stature that after 10,000 years we (some of us, not all) are only regaining today.³¹⁵ We would be remiss not to also mention that,

³¹³Having singled out three (ancient, liberal and Marxist) outstanding traditions of the West, in a formal sense these three share a common framework with regard to the nature of Power. This can be grasped by even a careless reading of their most important representatives (Aristotle's *Politics*, Hobbes' *Leviathan* and Engels' *The Origins of the Family, Private Property and the State*): In the former two a doctrine of human nature and in the last a productivist schematization of human development are the underlying bases on which the right ordering of social relations among men and the political are understood, and in which the state is determined as just, necessary or abolished. Each theorization may be internally consistent, but none can be evidentially justified (and that is what, first, they have in common), whether the evidence is archaeological, genetic, ethnographic or sociological. In each case, the doctrines or scheme are elaborated without evidentially mediated theory mediated by theoretically mediated evidence, that is, each is metaphysical (which is another way of saying what they, second, have in common).

³¹⁴Lest we forget, domestication of what has come to be known as livestock developed with and as part of the development of agriculture; and, while domesticated animals have immunities to all the pathogens they carry, viral infections are products of the circle of human-domesticated interactions. Thus, for example, the common cold (a coronavirus) has developed from the relation with horses; smallpox and tuberculosis from cattle; chickenpox from chickens; measles from pigs; and influenza (in its most devastating forms, avian and swine flus) from chickens, ducks and pigs.

For a general review of the origination of common infectious disease in animal domestication, see L.K. Horwitz and P. Smith, "The Contribution of Animal Domestication to the Spread of Zoonoses: A Case Study From the Southern Levant," *Anthropozoologica* 31 (2000): 77-84.

³¹⁵Mark Nathan Cohen and George J. Armelagos (eds.), *Paleopathology at the Origins of Agriculture*. Orlando, 1984: 7-8; 38; 67; 68; 120; 121; 124; 125; 129-130; 149; 183-184; 202-203; 206-207; 210-211; 297; 298-299; 361; 436; 484; 525; 237; 575-576; 586; 587; 588, 594.

But consider a further study that is directly relevant to the time and place we have considered, the Levant from 10,000 to 7,000 years ago.

The archaeological work done in 1972 and 1973 in excavations at Abu Hureyra, now northern Syria, produced "skeletal remains of about 162 individuals: 75 children and 87 adults, of whom 44 were female, 27 male and 16 of undetermined sex have been identified from seven trenches dug" at the site.

The "bones reveal details of the daily life of the Abu Hureyra people and, therefore, that of other Neolithic groups whose members had made the transition from hunting and gathering to an agricultural economy. The marks of life experience some wrought by disease, some by work... imprinted on the bones and teeth of the skeleton" of those inhabitants who

though perhaps only retrospectively recognized, sedentary existence creates social tensions, resource depletion (e.g., firewood) and sanitation problems, which nomadic groups do not experience... It is really, really ludicrous and absurd to speak of agriculture as progress, as an advance in human development... Moreover, there is clearly at least one tradition which would not, strictly speaking, recognize gathering as work: Since Marx held the "labor process" in its "simple form" consists of labor as activity, the object of the activity on which the activity is performed and the instrument deployed in laboring, plucking fruit from a tree, gathering seeds from plants and picking berries, would not constitute work in the first place since gathering among archaic peoples was absent the instrument³¹⁶ ...

Second, as soon as we consider archaic communities, the reality of a non-coercive political power becomes visible. How so? If the state is counterposed to the rest of the community as the domain that incarnates armed force, then these communities were stateless. Yet in these communities, we are faced with a personal bearer of the relations of a novel sphere of the community in which impotent power appears, the archaic chief who simply had no power to command, to order, to set forth what was to be, what must be done and who was to do it. He had no armed force to which he could resort in order to enforce his will. Other members of the community could simply ignore him, and if his demands become obsessive or persistently unreasonable, they replaced him. Beyond his ceremonial functions, what he did do was to largely consume his free time in oration and gift giving, and herein lies his positive role: His speeches were about, and his gift-giving (he was always the "poorest" person in the community) aimed at maintaining, unity, at peacemaking, as an effort to prevent the emergence of a pronounced social differentiation, stratification within the community. This chief was no haphazard extrusion arising out of the community. Members of the community chose, selected, him as chief, he was listened to, for it was largely his eloquence that permitted him to retain this, his "position" within the community. It was as if (we would say there was) an operatively communal intentionality that expressed a freely chosen desire to

resided in Abu Hureyra beginning about 9800 years ago.

"One of the first skeletal traits we noticed were signs of extra and sometimes excessive strains caused by the carrying of loads, most likely game, grain and building materials. The evidence was most conspicuous among the young. If adolescents are required to labor in this way, one can expect changes in the shape of the upper vertebrae. That is what we found. It is also probable that the loads were carried on the head: the hook-shaped parts of the vertebrae in the neck are enlarged, indicating that the bones developed a buttressing support. Otherwise, the neck might have wobbled under the weight of a heavy burden. In some individuals, we found degenerative changes in the neck vertebrae that may have arisen from injuries sustained by bearing weight.

"...removing the outer husk of the seeds by pounding them with a pestle in a mortar, another chore done while kneeling would have been an essential step in preparing the grains. Probably both tasks were involved in creating the vertebral deformities, but it is unlikely that mortar-and-pestle work caused the toe deformities: the laborer could have changed positions while pounding but not while grinding [at a saddle quern, a stone mill for grinding grain by hand].

"So it was the preparation of grain for eating that was the most demanding and labor-intensive activity of the settlement[...]. The grain had to be pounded every day because the seeds would not keep once they were dehusked. The dehusking with mortar and pestle and the subsequent grinding in a saddle quern would have taken many hours.

What we had found on the bones, then, were the telltale signs of long hours spent at such labor...

"Kneeling for many hours strains the toes and knees, whereas grinding puts additional pressure on the hips and, especially, the lower back. The characteristic injuries we found on the last dorsal vertebra were disk damage and crushing. Such injuries could occur if the grinder overshot the far end of the saddle quern during the forward push or recoiled to the starting position too quickly or vigorously.

"During grinding, the body pivots alternately around the knee and hip joints. The movement subjects the femurs (thigh bones) to considerable bending stresses. These bones thus develop a distinct buttress along the back to counteract the bending moments imposed from the hip and the knee as the weight of the body swings back and forth across the saddle quern. The knee also takes a lot of pressure because it serves as the pivot for the movement. Thus, the joint surfaces enlarge. All these effects appear on a set of bones we studied. The femurs were curved and buttressed. The knees show bony extensions on their articular surfaces. The feet are also subjected to heavy pressure as one grinds grain on a quern. The toes are curled forward to provide leverage, which is supplied in large part by the big toes. In the remains from Abu Hureyra, the first metatarsal joints of the toes are enlarged and often injured. There are also signs of cartilage damage: smooth, polished surfaces at the metatarsal joint indicate that bone had rubbed on bone. In some individuals, a gross osteoarthritis had developed." Etc., etc. Theya Molleson, "The Eloquent Bones of Abu Hureyra," *Scientific American*, 271/2 (1994): 70-75.

³¹⁶Karl Marx, *Kapital. Kritik der politischen Ökonomie. Buch I: Der Produktionsprozeß des Kapitals. Marx-Engels Werke, Bd. 23*. Berlin (DDR), 1962, Kapitel 5.1: 194, where he explicitly states, "Der Gegenstand, dessen sich der Arbeiter unmittelbar bemächtigt - abgesehen von der Ergreifung fertiger Lebensmittel, der Früchte z.B., wobei seine eignen Leibesorgane allein als Arbeitsmittel dienen - ist nicht der Arbeitsgegenstand, sondern das Arbeitsmittel." ("The object which the worker immediately takes hold of - apart from seizing ready-made subsistence, such as fruits, in the course of which his own bodily organs serve as the instrument of labor - is not the object of labor but its instrument." Our translation).

forgo labor, thus surpluses (and when or where they were generated, they were immediately consumed) and stratification and the community achieved this by *rendering power itself impotent*. It was in establishing this sphere of the community that archaic individuals resisted the return of what they, as a community, comprehended as a purely natural determination, that through it they created their unitary image of themselves, a nascent self-reflection and societal reflexivity, that they prevented a functional distinction between different activities to crystallize and become the basis of social stratification, and that they distinguished themselves essentially within the course of human history and development within nature.

The chief, then, did not characterize archaic communities at their origins, but only as fully developed agricultural communities *with their stratification, power, labor and surpluses* formed. It was this sociation that formed the outside of and other to archaic communities to which he, the chief, pointed to, warned and pleaded against in undertaking his oration...

Evolutionarily, hierarchical relations appeared in the higher primates (in the deference species individuals composing the troop, especially the females and the young, accorded a dominant male or males). *Similarly, they shaped the separate development of hominid, late hominid, archaic Homo sapiens, and fully modern human communities down to about 12,000 years ago. They did not appear in a specific form of archaic communities (those that were sedentary and geographical situated in zones of natural abundance), or they weakly reappeared only in functional form in short durations committed to work in which different worlds of men (as hunters) and women (as gatherers) articulated themselves and then only to dissolve in community life. Here the distinction was suppressed, strictly natural determinism was in good measure (but not entirely) overcome... From this point forward, however, we witness a separate "development," agricultural, all stratified, and later class based societies constitute a continuous movement* (perversely justifying Marx's concept of "prehistory") *in which a novel form of hierarchical relations, those of command and obedience, take shape, ultimately forcefully so, in tributary societies established on the productive foundations of grain agriculture. In the successive of historical societies, these relations have gone through variations, ranging from brutal enforcement to ideological refinement but have not undergone extensive development, at least to the advent of capital: Reconstructed on the basis of institutionally separate Power, these relations have run amuck* (democratic pretensions notwithstanding) *in capitalist modernity* wherein, subject to abstract labor and daily life predicated on a war of all against all, the various social classes, strata and layers have internalized these relations which now largely are the basis of personality, recreated as egoistic, mutilated, aggressive and belligerent: *Abstract labor, hierarchical social relations... inequality, exploitation, oppression all, to boot, depth psychologically rooted in individuals... are the contemporary forms of a bestiality that haunts humanity, the upsurge of strictly natural determination that is humanly unnatural to the extent that humanity has not unmade it.*

Yet the social existence of archaic individuals, shaped by the institution of an undeveloped polity of sorts, was not determined by labor, stratification or Power nor, as a consequence, was it subject to a purely natural determinism.

Non-Capitalist, Human Communities (Forms of Sociation) and Earthly Nature

Society is a human form, but as our reconstruction (*The Materialist Dialectic*) indicates, appearing in nature "prior to" humanity, it is the humanly natural shape of interaction among men and women. Hunting, hunting and gathering, farming and animal domestication, and cropping (agriculture) are, as we have described them, so many existentially determinant types or kinds of activity that characterize the earliest forms of sociation, the last defining the contours of human history. Moreover, our account apprehends them as they first appeared in history, that is, as tendential developments that at the moment of their appearance were still to undergo further development, and following the Younger Dryas *as developments in a world in flux, developments that co-existed over long stretches of time...* We are now ready to understand the more permanent, stable forms of sociation, the decisive ones in relation to one another as they appeared in history.

Cosmologically grounded climate transformation effectively ended the Upper Paleolithic and brought into being an interglacial, a geological epoch marked in human terms by the establishment of sedentary living. Though numerous, distinct forms of sociation have since appeared historically, broadly speaking we can distinguish three great epochs in the sedentary history of humanity. Each is designated by their dominant form of sociation, and comprehended by their fundamental activities and the central social features that characterize them. These epochs are the archaic, the tributary and capitalist modernity. The

first is by far the oldest and longest lasting.

Archaic communities as distinctive communities, and not as a fusion of forms ("fused" precisely to the extent they share features in common with stratified agricultural societies), are distinguished by a settled social life (which separates them from hunter-gatherer bands as nomadic groups), the absence of property in production, the nonexistence of coercive political power (a state), by a material abundance and by social individuals who lack an elaborate need structure, are absent egoism and the extremely individualized subjectivity raised upon it, which taken together renders social labor largely superfluous. These communities are absent an "economy" (that is, a sphere of material production).³¹⁷

Tributary formations are by and large characterized by village-based sedentary agriculture, administrative towns and a state which is domiciled, if you will, in the town. That state is identified with the personage of a king and in a more remote sense with his household, and is largely external to the daily life of the village communities (which often particularly in all ancient and some modern forms inhibits the penetration of capital through a regular division of communal lands).

The village communities stand opposite the state which oppresses them first and foremost by the extraction of tribute, then, in ancient world in particular, by the periodic conscription of labor in massive construction of dikes and dams, irrigation ditches and canals, in temples and burial sites. In modern tributary formations, slavery, corvée labor, serfdom and other forms of coercion may also be important determinants of social life. Above the village level these societies are highly stratified, perhaps in some cases based upon class differentiation, material inequality is at once rampant and extreme. But before ancient tributary formations fully matured (appearing as ancient civilizations) and characterized a distinctive epoch in human history, a divine kingship descending directly from the gods and unifying the various distinct communities characterized nearly all tributary civilizations, writing in its various early forms had appeared, metals such as bronze and copper had become widely used in productive activities, a monumental art and architecture (as in temples, pyramids, palaces, etc.) had already long "advanced" beyond its initial development.

Linked to both ancient and modern precapitalist civilizations, these social formations exhibit *de jure* statified forms of property in production while in practice the villages engage in either farming or agriculture in which their lands are cultivated communally. Statified property is really an inadequate modern construction: The state is, as we said, identified with the personage of a king, and "property," that is, productive land, belongs to that personage. There is no conception of property as such in ancient tributary forms; while in modern forms, because the state is more institutionally bureaucratized and because modern strata (especially merchants) play a role in this form of sociation, there is some private property in production (say in movables, in merchants' inventory), productive land still formally and in all historical significant events and developments where "ownership" is at issue belongs to kingship. (This is quite clear in the paradigmatic case of modern tributary formations, Tokugawa Japan, Tsarist Russia, and the Aztec and Ottoman empires).³¹⁸

³¹⁷Even though farming, an intermediate form, approximates the situation of archaic communities far more than that of tributary societies, in this secondary form there is limited labor. Compare Fagan, *Elixir*, 30, 40, 42, 43.

³¹⁸It should be noted that modern tributary formations differ from ancient forms (Egypt, Shang China, Crete) more or less in four ways with respect to indifference to the village communities.

First, modern tributary communities included not only villages but small urban conglomerations, towns with a significant social layer of strictly town dwellers (merchants and artisans). In our examples, the Aztec Empire exhibited only towns, leading towns and subordinate ones (*sujetos*, the Spanish term); Tokugawa Japan featured both villages and towns.

Thus, second, In ancient forms the villages themselves constitute one homogeneous layer in the formation counterposed to other social groups, hence itself an element in stratification; while in modern forms social division, a hard stratification, even class relations, can penetrate the village community itself; for instance, the Japanese village of the modern era featured a mass of poor peasant allods and a handful of very well-to-peasant landowners (in a language that belong to a later era, *kulaks*, i.e., wealthy peasants who also engaged in lending as usurers); the Aztec town, on the other hand, also had its well-to-do, but positions of power were embodied in the personage of the *tlatoani* (cacique) who resided in the lead town (*cabecera*, the Spanish term), and who was an official of the state. In Japan, private proprietorship in land (as opposed to its communal working) appeared, though in the end the greatest lord, the Shogun (like the Tsar in Russia in the same era), could appropriate these lands at will.

The third difference concerns tribute: Modern tributary state officials responsible for collection of tribute were, in a qualitative way, invasive; they had to be, for the burden of tribute placed on subjects, in all cases peasants (in Mesoamerica, *macegual*, the Spanish term from the Nahuatl *macehualli*, the Indian commoner), was far greater. In Tokugawa Japan where stratified positions in production, rigid social hierarchy and vast inequality were pushed about as far as they could go in a tributary civilization, a huge portion of the socially necessary substance required to sustain the peasantry as human beings was forcibly extracted as tribute. A yearly tribute (*nengu*, "land tax") ranged from 40% to 50% of yield; and, of course, it was paid in kind, as rice. It was enforced by disarming the peasants (after 1601); by the

The central features of capitalism are, albeit briefly, examined (in two discussions)³¹⁹ below.

Although first appearing sequentially (they are also simultaneous), these broad forms of sociation are not "stages" in human formation, do not constitute a development: We can document that the archaic has covered the face of the Earth beginning some 10,000-12,000 years (and its lineaments extend further back, though the evidence is more sketchy) and that tributary societies were well formed (but not fully developed, i.e., not yet ancient civilizations) some 6,000 years.³²⁰ The two co-existed long into the epoch of capitalist modernity, in fact into the twentieth century.

Archaic bands who had already forgone their nomadism and settled into sedentary communities may have exhibited different possibilities to women; toward the end of the Younger Dryas these bands may have been broken up by *the decision of women to abandon them* for agricultural life, its arduous work notwithstanding, for reason of the security that material surpluses offered them and their children. But in our view this was not common. In any case, archaic communities did not dissolve under the weight of their own contradictions, especially in the zones of natural abundance; since here in the objectively social sense anthropological accounts suggest they were most satisfied with this unitary organization of

armed presence of samurai in the castle towns ready to back up tribute collectors (samurai, shogunate officials such as the collectors, the great lords called daimyōs and the shogun and his entourage all lived off this surplus, itself cutting into socially reproductive needs of the peasants); and, beyond this, a system of monitoring, spying, within the village (the Ten-Man Group, *Jūnin-gumi*), one of Toyotomi Hideyoshi's many reforms,* was established to insure the peasant militancy and uprisings (which characterized decades of mid-sixteenth century civil war) did not recur, but instead intensified peasant atomization. The whole situation revolved around the tribute: As Honda Masanobu, an advisor in whom Hideyoshi put much store, infamously remarked the state rested on the peasantry, and the peasant was to be handled gingerly, leaving him with just enough food to live on, no more, the rest to be appropriated as tribute by the state. (For Tokugawa Japan, see *Genesis of Capital*, Book I, Division II, Part V, "Hideyoshi, the *Taikō no Kenchi* and Objective Historical Outcomes" and Part VI in its entirety). Across space and time, in a formal sense much the same situation with regard to tribute obtained in the Aztec Empire both before and immediately after the Spanish conquest: Each tribute collector (tequitlato, the Nahuatl term) surveyed the land of each subject, tributary, at harvest time, counting maize ears, calculating what would suffice for all household members until the next harvest, and did the same with beans, chiles and other agriculture products, leaving enough for subsistence and appropriating the rest; further payments were collected in chickens, cacao, honey, gold and, or, silver when and where it existed, say, among town artisans who were also subject to appropriation of a portion of the work. See Charles Gibson, *The Aztecs under Spanish Rule: A History of the Indians of the Valley of Mexico, 1519-1810*. Stanford, 1964: 196, 206.

A final, fourth difference between ancient and modern tributary formations was a fantastic development of a bureaucratic centralism (at least relative to the entourage and household of a divine king, essentially his family, a coterie of tribute collectors and a small unit of armed retainers, who reigned over ancient tributary formations). Directly related but external to the communities, centralism was not just a functional requirement: The invasive penetration of the community by the state was real social and historical fact, a necessary outcome of the extent of tribute extractions.

³¹⁹See *The Critique of Science*, the Interlude in its entirety, and *Capitalism and the Domination of Nature*, Parts II and III.

³²⁰Dating is dicey. Throughout we use figures for the origins of archaic communities that range from 10,000 to 12,000 years before the present. This is not typographical error, nor is it faulty dating. The problem is, in our view, more or less intractable:

Whereas the dating of the origins of a site said to represent a form of sociation is merely approximate, a firm date is often unachievable in principle. Tools, utensils, seeds and plant residues, bones, architectural remnants, etc. are the basis for any evaluation of the origins and age of social forms. Absolute dates have been put forward for these material traces on the assumption of the continuous, constant decay of radiocarbon (¹⁴C) stored in organic matter. The assumption betrays the problem: After the death of an organism, radioactive carbon is released, or better, transformed into non-radioactive carbon (¹²C), and it is the latter that is measured. The principle guiding such dating is the assumption that the atmospheric quantity of radioactive carbon absorbed by an organism in its lifetime was constant, making it possible to give a sample based, laboratory measure of absolute age. In point of fact, at the origins of atmospheric radioactive carbon formation is incoming cosmic radiation, and this, the latter, has fluctuated over millennia. Now ¹⁴C dates can be calibrated to adjust for the variations in cosmic radiation. Two sets of dates have been the consequences, those that are calibrated and are designated "BC," and those that are not and are designated "BP" (before the present where "the present" is taken as the year 1950). Both dates are given in archaeological literature, largely because some sites dated in the uncalibrated manner have disappeared and are no longer accessible. (Some sites, for instance, are beneath water as dams have been constructed and regions behind the dams flooded.) There is, then, no way to calibrate artifacts at such sites and compare the two sets of dates. Yet many of these dated and uncalibrated artifacts and sites concern the cradle of agriculture (the Levant, Near East and the Middle East).

Across a range of sites the two sets of dates, moreover, vary significantly. What we are left is the following: In the relation of dates from 6,000 BC to 12,000 BC to dates from 6,000 BP to 12,000 BP there is difference of from 650 to 1,950 years over this 6,000 year period, the smallest variation occurring at 6,000 BC/7300 BP and the largest at 12,000 BC/12,000 BP.

* Hideyoshi was regent and effectively Shogun, 1583-1598.

community life and sought to avoid stratification at every turn³²¹ (i.e., the absence of stratification most adequately embodied community intent). *In the historically significant sense, over historical time their solvent was not internal contradictions of development so-called, but has been conquest or enslavement by mercantile states in capital's epoch of formal domination, or penetration of the value form in capital's epoch of real domination*, either the penetration of waged labor by way of the dispossession of small rural producers or aggrandizement of peasant agriculturalists with dreams of becoming capitalist farmers, supported when necessary by the armed force of capitalist states, or both.

We want to be very clear on this: Archaic communities were hunters and gatherers, who often practiced a form of plant cultivation wrongly designated as "slash and burn" agriculture, more than mere gardening, one through which in varying degrees they maintained, shaped and effectively transformed various habitats (their spatial extent, their species composition) but not agriculture which entails existential dependency, and surely not grain agriculture: There was neither agriculture nor even farming, yet these communities were not nomadic. They may have periodically (over the course of many years) abandoned a settlement (to return latter as the soil regained its nutrients), or their settlements may have been longstanding, lasting over a number of generations. These communities were larger than hunter-gatherer bands (whose maximum size rarely if ever exceeded 25-30 individuals), ranging from a 25-50 at the low end to upwards a 1,000 at the high end. Among them were communities that lived largely by fishing, hence resided in villages constructed near bodies of water... If one wishes to call human, the archaeologically identified form, *Homo erectus*, then hunter-gatherer bands roamed the Earth for nearly two million years. If we start from anatomically modern man, *Homo sapiens sapiens*, hunter-gatherer bands were dominant for most of a hundred thousand years. Note that by 45,000 years ago, modern hunter gatherers were fully human in the sense that we recognize that term today: They buried their dead, cared for the sick and their elderly (this much too can be said about Neanderthals), and they possessed the same potential for cognitive development as members of societies that produced a Confucius, an Aristotle or an Einstein. They definitely do not represent some sort of infantile form of human development. Archaic communities, still hunter-gatherers, on the other hand, first began to appear in socially stable form, after a long development in which nomadic hunter-gatherers had occupied (albeit not densely) most of terrestrial Earth, over 10,000 years ago... So in describing three epochs in human history, we have excluded more than nine-tenths of the temporal span on which anatomically modern humans have occupied the face of the Earth: While this may appear spurious, we understand sociation in terms of the life of settled, stable and sedentary communities, for it is only sociation in this form that, potentially at least, gives rise to a distinctive, "institutionally" reflexive form of human life and activity that, in a sense we shall specify below, makes a free community possible...³²²

From about 20,000 to 18,000 years ago, temperatures in the non-tropic regions of the Earth were as cold as any period in the last 100,000 years (i.e., during the last glaciation). Yet bands of human hunters had spread across all of Africa (North Africa, on the northern reaches of the Sahara, along the lower Nile, central Africa around the vast area geographically encompassing the Nile at its origins, Lake Victoria, and in central southern Africa), the western reaches of Europe (western Scotland, Spain and France, just south of the Alps in contemporary Italy), "densely" across the Levant (Palestine or, if you prefer, contemporary Lebanon, Syria, Israel and Jordan), the eastern Anatolian plateau and in and about the origins of both the Euphrates and Tigris, along the Ganges in central India and southeast Asia (Malay

³²¹This is most clear in James C. Scott's various discussions, *The Art of Not Being Governed*, *passim*.

³²²As socially undivided, lacking labor, production and economy, free communities are formed wherever men and women seek to formulate the actual conditions for their unitary existence as a community. As such, they assume a form of human self-organization *sui generis* beyond the family, kinship or any other form that might be assumed to be "natural."

Existing this side of or beyond class societies, a free community is centered by an assembly of the people, a council or polity, call it the political. This is not merely a conceptual abstraction: It is a functionally distinct actual domain that does not stand above or apart from community members (which says the communities are stateless, and more): It is embedded in, "organizing," daily life. Again, it is not institutionally distinct or separate. Within the political, activity occurs directly, spontaneously as it were, where people are face to face, without the mediation of things. This assembly, council or polity at once dialogically constitutes a free community and generates the image it has of itself, that is, it is that domain wherein a community articulates, weighs and discusses its communality (sociality), and in so doing attempts to deal with the problem of unity and the possibility of emergent social division.

The political is a reflection of the image a community or society gives back to itself of itself in its effort to maintain that unity. As such, it is part of the self-constitution of the community as community in socially constituting practice of daily life. The assembly, council or polity is just as central to community as productive activity is in class societies, though it hardly exists in the same way or is determined in the same manner.

and Indonesian isles, New Guinea, the central Australian desert, Tasmania), and east Asia (along the central Yangtze in China). By 17,000 years ago, climate severity had lessened in Eurasia, season variability increased with slightly longer summers in a given year, maybe not the next, but recurring. By 16,000 years ago, sea levels across the planet began to rise (due to land-based glacial ice melt). Fifteen thousand years ago, a rapid warming occurred and within a further 1,000 years forests began to spread across Europe, central North America and elsewhere. According to conventional archaeology, it was at this moment (14,000 years ago, circa 12,000 BC) the first settlements in the America appeared.³²³ A thousand years later, there was a cold snap (the Younger Dryas) itself lasting twelve hundred years: Thousands of massive icebergs calved off from the retreating Laurentine ice sheet covering North America, and, by way of what is today Hudson Bay, released as much as two Sverdrups of fresh water into the North Atlantic temporarily shutting down the thermohaline circulation, in this case warm currents that flow north from the Gulf of Mexico heating northern Europe and Scandinavia. 696 But, by this time, the cave dwelling humans of the late Würm glacial had already long left their hillside and mountain abodes. In the Americas the megafauna, the mastodon, giant beavers and armadillos, camels, the giant ground sloth, stag moose, a guinea pig the size of a hippopotamus and others, all adapted to ice age climates, to cold, ice and snow and the steppe and tundra began to disappear, perhaps because they, most as slow breeding mammals, were evolutionarily ill-suited to the new climate, the rising temperatures and aridity in formerly well-watered regions (even as they as species had lived through several previous rapid climate changes from glaciers to warm interglacials), perhaps because, as favored animals hunted by ice age humans, they were killed off in orgies of slaughter as humans took far more than their share of the hungry and weakened among these species, perhaps as consequences of both climate change and human slaughter... The entire issue remains unresolved, perhaps unresolvable in principle...³²⁴

Human communities spread geographically rapidly after 14,000 years ago (though population density grew but slightly), but from that time forward they were compelled to transform their practices, hunt small animals and rely far more extensively... in a qualitative sense... on the vast variety of plants (including not only wild grasses, but nuts, berries and other flowers and seeds), many new, for nutrition. In the full sense, those human engaged simply as hunters remade themselves as hunter-gatherers, where gathering became a coeval activity. (It is worth recalling that many, perhaps the majority of human communities at this moment were in fact primarily gatherers.) Gathering has subtle, yet transformative consequences.

While in really rich, plant luxuriant ecologies (in the tropics), it can be done effortlessly, in temperate zones seasonal changes require that plant foods such as nuts be stored, put in underground pits or in some form of container, say a covered basket, above ground. Nuts, shells, etc., high in protein, may in their immediately natural form be too difficult (like animal flesh) for some (e.g., pregnant women) to metabolize or again contain indigestible even poison substances, suggesting (for which there is extensive archaeological evidence) they were pulverized, boiled or soaked, processed as it were, and producing oils and solids were eaten in different forms or stored. Food preparation and storage of this order dramatically curtailed mobility. Some, perhaps many nomadic bands settled down to live in communities, often around lakes or rivers that offered them, not just other (fish and shelled fish) sources of food but, access to a variety of life forms (birds, rodents, mammals of all sorts) that habitually frequented such places as watering holes. This transformation from large mammalian hunting to plant cultivation, fishing and small animal hunting, from nomadic bands to settled, and in one development as we shall see, *proto-agricultural farming communities required*, and this is well recognized in the

³²³See, however, the discussion (fn. 238) of the populating of the Americas appearing in *The Materialist Dialectic*, Part VI, "Climate Change, the Fate of the Neanderthals, Societal Hierarchy," above.

696 Broecker, *The Great Ocean Conveyor*, Chapter, 6; and also Phil Conkling, Richard Alley, Wallace Broecker and George Denton, *The Fate of Greenland*. New York, 2010: Chapter 5.

The time frame of the shutdown is geological. "Temporarily" refers to that twelve hundred years. A Sverdrup (named after the Norwegian oceanographer, Han Ulrich Sverdrup) is a measure of ocean current movement. One Sverdrup is equal to the flow of one million cubic meters of water per second per square kilometer.

In point of fact, thermohaline conveyor currents do not shutdown as glacial melt produces massive amounts of fresh lighter water (lighter because it lacks salt) preventing downwelling; rather, across vast oceans expanses there is a huge southerly shift in the locations of its sites of origins (upwelling, rise of deep water) and end (downwelling, formation of deep water). This shift, of course, is only associated with large-scale, dramatic climate changes... such as the one we are now undergoing.

³²⁴Again, we refer the reader to the footnoted discussion (fn. 238) of populating the Americas, *The Materialist Dialectic* Part VI, "Climate Change, the Fate of the Neanderthals, Societal Hierarchy."

anthropological-archaeological literature (itself based on the stratigraphic record, middens deposits, etc.), *no technical or technological innovation* (and none is visible in the archaeological record), no growth, expansion and development of extant "productive forces" (where neither hoes or plows nor heavy axes, but digging sticks and flint-bladed sickles, constituted such); furthermore, prior to movement into the tropics and the settlement there, these archaic communities exhibited socially deliberative choice, once there to remain there, at least among those nomadic bands that engaged heavily in hunting a decision giving up a return to megafauna hunting... exhibiting *conscious action on the basis of which the community as a whole was remade* (the human world was reconstructed), introducing a broad form of sociation based on revolutionized social relationships: Here, *for the first time humanly natural equality in social relations (indicating the absence of Power) appeared...*

Not coincidentally, the emergence of archaic communities in a socially stable, fully elaborated form was geologically situated in the warm breath of the current interglacial, appearing in their recognizable, geographically longest surviving form in the wondrously biologically diverse broadly tropical forests, richly abundantly in life forms. And, not coincidentally, archaic peoples' elaboration of this stable form inclusive of *a distinctive, yet impotent political sphere of the community* was initially undertaken at the same time as the most rudimentary form of the state first appeared. Having already taken shape in the practice of daily life, *coercive power* firmly if only initially established itself upon stratification that went beyond farming; It rooted itself in sedentary, tendentially grain agricultural societies predicated on material surpluses and inequality (i.e., a division of social labor which was becoming fixed). The entirely novel stratified societal development constituted the earliest forerunner of ancient civilizations (tributary formations). Occurring side by side and alongside one another *at different times in different places* (earliest in the Middle East, latest in the Americas, in-between elsewhere), in the grand sweep of history these "simultaneous" developments were anything but unrelated, accidental. Forming, disappearing and re-forming over and again through history as states waxed and waned, *archaic societies politically stabilized themselves as a countermovement to the initial development of a socially determinant stratification and nascent Power, the state in its most primitive, earliest shape and then later in more developed shapes*: But their "mode of existence" was not decided by a "low level of development," but by the conscious refusal of material surpluses and with it stratification in order to prevent the emergence of that state, always reaffirming themselves in their opposition to it, as coercive Power raised over and above the community.

For those village communities that were the basis of ancient tributary formations, stratification was soft and minimal, and though a developing division of labor existed it was generally functional. (*The high civilizations of this ancient world... dynastic Egypt of the Pharaohs, southern Sumerian Mesopotamia, Shang China... were based on agriculture not farming, towns not villages wherein a fixed, not a functional, division of labor was characteristic.*) In particular, Power in this type of society (often called despotic) *immediately* existed in the person of the tax collector, who did not directly intervene, hence did not directly shape, the daily life of the village community. The tax, in kind, was almost always grain. Thus, it needs to be said that in the long run, devotion to a single grain (wheat, rice), grain agriculture in *this* sense, is marked by stratification and statification whether in the ancient despotic form or later shapes... Outside the strictly tropic zones, originating first in the fertile river valley between the upper reaches of the Tigris and Euphrates, then independently in the Yangtze and Yellow River basin, the Ganges plain, the Andes and central Mesoamerican highlands, in the upper reaches of the Nile (i.e., ancient upper Egypt where its main branches form a confluence), in central eastern Africa and the lands immediately east of the Mississippi in its geographical central flow, agriculture was first developed by communities of hunter gatherers who lived in more or less permanent settlements. These were affluent groupings living alongside or near rich aquatic habitats, which reproduced themselves from a large variety of wild plants, often smaller animals, and especially water life (mollusks and other shell life, turtles, fish, etc.). These affluent, secure humanly natural milieus ...into which these communities had settled and remade as such... were bounded, as it were, by less secure, less bountiful environments (and communities and nomadic bands), both in historical time and geographical space. In each case, it was largely climate change that introduced this broader, unsettling disturbance in the communities' relations to the nature in which they were embedded. It was, in fact, the Younger Dryas which had brought cooler, dryer climatic conditions for over a thousand years. With its conclusion, wetter and warmer conditions returned, and with these conditions within 200-300 years agriculture first appeared along the Fertile Crescent. (Roughly similar conditions also seemed to have obtained later along the Yangtze and Yellow rivers and still later in the Andes and the Mesoamerican central highlands adjacent tropic forests)... To be sure, settled as

opposed to nomadic social life already presupposed a total reorganization of that life, one that was undertaken in light of, illuminated by, a vision of the specific human communities in their relation to spirit worlds neatly embedded in the fabric of earthly nature...

The Younger Dryas had compressed populations; sedentary groups had been forced southward: Some returned to nomadic life, others reestablished sedentary communities occupying adjacent regions into which expansion would likely involve bloody struggle. These communities had, thus, entered the long cold spell without nomadic mobility acting as a constraint on childbearing. They were demographically denser precisely because of their past (relative) affluence. But the change in climate effectively reduced the resources (plants and animal prey) that had been previously available to a socially evolving communitarian remaking, introducing as it were very real limitations that impinged on the communities, in certain cases (for example, in southern Mesopotamia) a real drought-based scarcity. Faced with this new complex of conditions, these communities began to experiment, or to systematically experiment with the wild food resources all hunter-gatherers cultivated, beginning with seed plants (not root crops or animals, or at least not at first) and with perhaps, even likely, the intent to increase reliability and yield.³²⁵ Before the end of the Younger Dryas a surrounding nature they had remade offered them a margin of safety (new if not entirely adequate resources, but enough to commit to experimentation), while their river or lake locales (even as these shrank or contracted) further offered fertile and moist soils even as these had become drier. If success in some if not all communities had been achieved (and in fact it was), then success itself would have further guaranteed continuation of nascent farming practices. Increasing yield cut two ways, with a likely increase in population (especially as grain could now provide soft foods that would dramatically shorten the time mothers were required to provide their own milk to their young) and surpluses as well, each development reinforcing, calling forth and demanding, the other. Because agriculture is seasonal, from the very outset surpluses would also have required storage. As the demographical density of the community increased, the functional distribution of tasks multiplied.

Similarly, territorial expansion might have been mooted, and fortifications were constructed: Prior to accumulating any reliable surpluses, agricultural production required irrigation, that is, the construction of ditches, canals and dams of varying degrees of sophistication. Supervision appeared in the tasks of construction however temporary. "Bosses" emerged, leadership, *nascent Power elaborated itself with agriculture at its origins, as humanly unnatural social relationships, we repeat, a bestiality in the form of hierarchical relations of authority and subordination in productive activity remained unmade. A point of no return had been reached: There was no going back...*

Marx treated archaic communities and tributary formations as so many of the forms of natural economy that preceded capitalist production. He suggested, for example, "Die naturwüchsige Stammgemeinschaft... ist die erste Voraussetzung - die Gemeinschaftlichkeit in Blut, Sprache, Sitten etc. - der Aneignung der objektiven Bedingungen ihres Lebens, und der sich reproduzierenden und vergegenständlichenden Tätigkeit desselben (Tätigkeit als Hirten, Jäger, Ackerbauer etc.) Die Erde ist das große Laboratorium, das Arsenal, das sowohl das Arbeitsmittel, wie das Arbeitsmaterial liefert, wie den Sitz, die Basis des Gemeinwesens."³²⁶ While he was mistaken to think archaic communities³²⁷ were organized by any socially determinant form of labor, he noted, as do we, that, among other relations and processes, what characterized both them and the village societies of tributary formations was the practical integration of human activity and surrounding nature. At the same time, from Marx's perspective

³²⁵ Archaic peoples gather, and in gathering, they pick the largest plant seeds.

About 10,000 years ago (the timeline is reconstructed through seed proxies), these same peoples began to select and plant (i.e., sow, broadcast, propagate) larger seeds... Middens reveal there were, noticeably so, more larger seeds to pick... Rachis, the tiny stem that links each grain to the seed head, began to change also. Gatherers like them brittle, since they can slam the seed head against the ground or a rock and catch the falling grains. Farmer prefers the rachis sturdy: The stem can be cut whole, and returning to the village where the cut plant can be thrashed, the grains will not be lost in route. Farmers selected for strong, sturdy rachises, which too show up in the archaeological record. These plants require human sowing, since they do not straightforwardly, simply or easily propagate... Over generations of plants (and farmers), the plant character (its genome) has itself been altered... In an entirely abstract manner (i.e., absent all determinant social context), these developments are at the heart of the genesis of agriculture.

³²⁶ "The naturally arisen clan community ... is the first presupposition - the communality of blood, language, customary right - for the appropriation of the objective conditions of its life, and of its reproducing and objectifying activity (activity as herdsmen, hunters, tillers etc.). The earth is the great workshop, the arsenal which furnishes both means and material of labor, as well as the seat, the foundation of the community" (Our translation. Emphases in the original deleted). Karl Marx, *Grundrisse*, "Formen, die der kapitalistische Produktion vorhergehen" in *Ökonomische Manuskripte, 1857/1858. Marx-Engels Werke, Bd. 42*. Berlin (DDR), 1983: 384.

³²⁷ So-called "primitive communist societies."

(one in this case we fully share), by way of contrast we can anticipatorily apprehend the specificity of capitalism and its development in its entirely "unnatural" form, that is its institutional distinctiveness which we have discussed³²⁸ and, which... magnifying that distinctiveness develops through an enormous practical expansion of built environment, means of production and the mass of circulating commodities, an expansion that not just mediates our relation to nature but ...gives rise to the conviction that we, as humans, are ourselves entirely *unnatural* beings...

Earthly nature co-evolved with different species of hominids and humans largely through their activity. Fire and its use in particular played a central role in this co-evolution. But as archaic communities of modern men appeared, *co-evolution gave way to a fully practical integration of these communities and surrounding nature*: Earthly nature now everywhere (or at least everywhere humanity occupied) became a configuration of natural life forms, especially plant but animal life also, that *depended on human cultivation for their existence, and hence, while remaining natural and other, were an inseparable part of a specific form of human sociation*. Plants were cultivated as medicines, for ceremonial purposes, for cosmetic derivation (dyes) as well as a source of food and nutrition. Though perhaps once common among precapitalist communities yet extraordinary and singular today, their cultivation in part created an integration of community and nature for which even a radical transformation of the latter, serving to enhance socially productive and reproductive practices, was not synonymous with its destruction but with *its* enhancement. For these communities, unlike those formed in New York, London or Paris where nature appears, and is watched (effectively contemplated), in the visual media spectacle, the boundaries between (in bourgeois terms) the "wild" and the "tame," native and domesticated, were easily crossed when and where they even existed in the first place...³²⁹

Nomadic hunter-gatherer bands used literally thousands of plants for food consumption in particular, but for medicinal purposes and in fashioning tools as well. Similarly, archaic communities. The development of sedentary, village community-based agriculture sharply reduced the quantity of plants utilized for nourishment. But this development at the same time *dramatically increased diversity within each species of domesticated plants*. Over ten thousand years, selecting for stem height, for the length of the stem connecting seed to head, for seed size, quantity, etc., agriculturalists, whether community villagers, peasants, or even petty capitalist farmers, have cultivated, thereby co-creating, a burgeoning internal species diversity...

In developmental terms, the entire epoch of agriculture beginning from its origins 10,000 years ago has been extraordinarily slow, sluggish, "stagnate" as bourgeois and productivists (ostensibly communists) like to say, especially relative to the era of real domination in agriculture which, when contrasted with this entire ten millennia long epoch, has seen more so-called technical advances in the past half century than

³²⁸ *The Critique of Science, Interlude.*

³²⁹ The integration of these communities and their natural milieu was achieved through practices of plant husbandry, practices that included any or all of the following... broadcasting grain grass seed in freshly fired fields, planting cuttings and transplanting "wild" plants, clearing land for planting seeds of "wild" greens, trees or shrubs or for planting domestic crops such as maize in selected locales ...extending from a very limited remaking to a full transformation of these communities' local ecology. In contradistinction, the wild, untouched nature as seen from television and film in New York, London or Paris today reproduces the same mystification in contemporary form that the first Europeans in the "New World" were subject to in their apprehension of these "new" lands in terms of a "state of nature," a Garden or Paradise, a "wilderness," etc., as the case may have been.

The whole perspective here is radically different from that the immediately arises, whatever its elaboration, in the inverted world of capital: The co-production of human communities with earthly nature permits of an unbroken if not endless, mutual formation that is *achieved with nature and not against it, i.e., with earthly nature in its own incessant remaking* (that is, the modification and transformation of the abiotic by life, especially microbiotic life, that is simultaneously shaped by inorganic nature): The entire concept presupposes recognition that nature, here earthly nature, because it is visibly self-regulatory, has its own integrity, its own coherency of *which man is part* (and which we can contribute to and augment in our own self-expansive development), its own autonomy, its own presuppositions, which we can, as it were, enter into allowing us to remake, to jointly create, humanized nature anew, which in a non-Promethean, entirely *unproductivist* manner will augment natural evolution and development. Deep into the epoch of capital's real domination, such a relation has remained visible. As late as 1982, just these types of relations existed between an old Papago caretaker, personally bearing the traditions of his people, and the vibrant, luxurious animal, plant and microbiotic life, the fruit-bearing trees, the marshland vegetative life, the brook and pond, and the birds, small mammals and insects these attracted, in the Sonoran Desert oasis, *Ki:towak*. Papago activity can be revealingly contrasted to that of the United States Park Service. Some thirty miles northwest at the Organ Pipe Cactus National Monument the Park Service, having forced the remnant Indian community out four decades earlier, touts its impoverished "wild" bird sanctuary at the ruined oasis, *A'al Waipia*. See Gary Paul Nabhan, *The Desert Smells Like Rain: A Naturalist in Papago Indian Country*. San Francisco, 1982: 89-97.

that entire preceding epoch: Beginning in the fifties of the nineteenth century particularly in the United States, technological inputs into agriculture have dramatically increased. At the level of the world, agriculture has been put on a fully capitalist basis since the second half of the twentieth century, i.e., over the last forty-five years, agricultural development has overwhelmingly been determined by inputs of seed, chemical fertilizers, herbicides and pesticides. This development has taken a singular form, namely, monocultural crop production, an important moment in capital's relentless destruction of biodiversity, itself a condition of specifically human existence.³³⁰

Archaism, Farming and Agriculture

The foregoing rests on the contraposition of archaism to agriculture, and archaic communities to agricultural village societies. Neither swiddening nor agriculture, to this point farming constitutes an intermediary activity whose explanatory function has been to suggest that human responses to pressures from long-term, dramatic climate change generated an imperceptible transition, not a revolutionary break, that brought agriculture into being. Dependent upon local climate and geography, the upshot was not a sequence, a development, but once farming and agriculture appeared the interpenetration of different forms of activity and sociation (hunting and gathering, farming, various combinations of both, and agriculture) could all be simultaneously found.

If the foregoing has been an effort to comprehend different forms of sociation, then it had a further purpose in explaining – by way of the appearance of agriculture – how tributary sociation, eventually tributary formations (or, if you prefer, ancient civilizations) might have arisen.

This further purpose may, in fact, have tacitly governed our entire reconstruction and prejudiced it to boot. For if we review our footnotes with a view to our sources, we can note that it is the Levant inclusive of ancient Mesopotamia, and Egypt (i.e., the eastern Sahara, Egypt as a whole and Nubia), from which our sense of the relations between archaism, farming and agriculture have formed.³³¹

The meaning of farming deployed here may not, however, be universal; and if so, we tend to tacitly suggest an illicit generalization. Steven Mithen characterizes the appearance of farming in late "Mesolithic" Europe in quite different terms... the Mesolithic is an archaeological designation for the period from the end of the Upper Palaeolithic down to the beginning of the Neolithic, or to speak more intelligibly from the final end of the last ice age marked by the warming that terminated the Younger Dryas about 11,600 years ago to the beginnings of agriculture, in Europe about 7,500-8,000 years ago. (We have already indicated agriculture appeared much earlier in the Fertile Crescent.)

Mithen contrasts farming activity to hunting and gathering, or more adequately the world farmers constructed to the natural world inhabited by hunter-gatherers. While Mithen implicitly operates with

³³⁰What have been the consequences of the monoculturation of agriculture? They are indisputable: The genetic diversity of food crops has dramatically, drastically, and rapidly narrowed. In the United States *alone*, of a list of 65 species of vegetables not a single one variety has decreased by less than 80%, and over 45 have declined in excess of 90%.* This development, is synonymous with the green "revolution" so-called as it first developed in India and then was generalized throughout the capitalist periphery, with the *entry of agriculture into the era of real domination*, with crop monoculture dominated by gigantic agricultural capitals that, destroying the genetic diversity of agricultural plant life, has inescapably put the very food resources of the vast populations of the world at risk.

For the destruction of biodiversity and its consequences, see the opening remarks of *Capitalism and the Domination of Nature*.

³³¹James C. Scott's analysis as a whole (*The Art of Not Being Governed*) also lends credence to the view that the same sorts of relations governed the rise of the predominant (tributary and archaic) forms of sociation on the peripheries of the southeast Asian massif, and thus from there nearly all of southeast Asia (i.e., today's southwestern China, northern Vietnam and Cambodia, much of Thailand and northern and central Malaysia).

* The figures cited below date from the beginning of the twentieth century, but the most dramatic decline, nay collapse, of species and species variety has come since 1960. Some examples, are provided in the following enumeration: Of different varieties, 94% of beets (numbering 288 varieties in 1903), 95% of cabbages (numbering 544 in 1903, 28 in 1990), corn (numbering 434 in 1903, 40 in 1990), 91% of eggplant (numbering 97 in 1903, 9 in 1990), 94% of peas (numbering 408 in 1903, 25 in 1990), 94% of spinach (numbering 109 varieties in 1903, 7 in 1990), 81% of tomato (numbering 408 in 1903, 79 in 1990) have disappeared.

The situation is no different with regard to fruits, for example, 90% of the pears (numbering 2,683 varieties in 1900) and 86% of apples varieties or species have disappeared. Cary Fowler and Pat Mooney, *Shattering: Food, Politics, and the Loss of Genetic Diversity*. Tucson (AR), 1990: 63-67.

Whether it is directly the action of plant breeders, agricultural development institutes, or the large seed companies, it is the great agricultural capitals that have eliminated vast numbers of varieties and species with a view, as always, to market share, turnover and profitability.

categories that prejudice hunter-gatherers, that sees in them remnants of forms of sociation that have been definitely superseded (he is not so crude as to deploy a sequence), and prejudices them in favor of the benefits of civilization, and while the metaphysical contraposition of "natural" to "human" (a term which, like "civilized," Mithen avoids using, preferring merely to excitedly and approvingly describe those aspects of changes introduced by agriculture, mind you the basis of civilization) cannot, as we have demonstrated in the foregoing, be sustained, his descriptions of farming as counterposed to hunting and gathering are worth citing at length:³³²

By 6000 BC the Mesolithic people of northern Europe were listening to fireside stories from visitors about a new people in the east, people who lived in great wooden houses and controlled the game. Soon they found their own Mesolithic neighbors using polished stone axes, molding cooking vessels from clay and herding cattle for themselves. While farming villages arrived within their own hunting grounds, Mesolithic eyes peered from behind trees at the timber long house, the tethered cattle and the sprouting crops...

The farmers appeared intent on controlling, dominating and transforming nature, Mesolithic culture had been no more than an extension of the nature world. Its chipped stone axes were merely an elaboration of nature's work, her use of rivers and frosts to break stone nodules apart and make sharp edges...

The pottery of the farmers – a product of mixing clay and sand, firing, decorating and printing – had no precedent with the natural world... a timber-framed long house... required nature to be torn apart and the world constructed anew...³³³

Mithen goes on to suggest his conviction that in least in Europe farming was as incompatible with hunting and gathering as agriculture. Indicating, as we do, that some women left archaic bands for the security that food surpluses might provide them and their children, he tells us, "Both land and women became sources of tension that often boiled over into the violence so vividly documented within the Mesolithic raves."³³⁴

Here in central and northern Europe, the evidence marshaled by Mithen does indeed suggest farming was quite different, that farmers may well have been aggressive and continually encroached on hunting lands over time, that conflict may have been the result. Here, then, farming would have been distinct. Neither hunting nor gathering, but not agriculture at least not in the sense of grain agriculture, for wherever it has appeared on Earth grain agriculture has given rise to tributary forms of sociation; and, where most successful, to ancient tributary civilizations.

What is different about farming in Europe is that for 4-5 millennia it remained the preserve of small communities of farmers. These too were non-statist communities, though they were markedly different in this respect: It is with and from them that private property in land originated, and thus, it was from them that the first large-scale non-tributary yet statist civilizations emerged, above all the ancient Roman Empire. In fact, it was along the Roman frontiers from the time of Caesar onward, the these two forms, those of Germanic peoples based on (decaying) village farming communities mixing communal and individual property in land and those of the Roman Empire, confronted one another. And, it might also be noted, that it was Rome with its Quiritarian ownership and its codification under Justin (*Corpus Juris Civilis*) which jurists early in the epoch of capital's formal domination over labor in production were to draw upon to formulate and elaborate a universal, unconditional concept of private property in production which was crucial to the rise of capitalism, especially to the social classes and strata who were its bearers.³³⁵

³³²The bigotry is explicit in Mithen's Epilogue to his *After the Ice*. It is entitled the "Blessings of Civilization."

³³³*Ibid*, 178.

³³⁴*Ibid*, 179.

That violence is suggested by damaged skeletal remains which exhibit breaks that went unhealed (and may have resulted in death), bones that had healed, bones that had been clubbed, broken and cut with axes or similar tools.

³³⁵For this, see *Genesis of Capital*, Book II (*Lineaments*), "The Appropriation of Roman Law in the Establishment of the Formal Domination of Labor over Capital in Production Its Role and Significance in the Rise of Capitalism."

In the early chapters of his *Before France and Germany: The Creation and Transformation of the Merovingian World* (Oxford, 1988), Patrick Geary nicely lays out the confrontation between Germanic peoples and the Roman legions along the Rhine frontier, while well describing and clarifying the forms of property and life each entertained.

*Natural Determinism and Some Limitations of Archaic Communities:
Between Stateless Communities and Subordination to the Formal Circuits of
Capital's Movement*

The foregoing has left us with two promises to redeem. The first concerns the questionable status of nomadic bands as archaic in the specific sense defined by the historical movement which witnessed the formation of the state and at the same moment exhibited a countermovement in the rise of "primitively" communist communities. The second concerns the extent to which archaic communities that are structured by gender inequality have actually overcome natural determinism. Retrieval of our first pledge can be done in short order; redeeming the second one is more complex. So begin by considering, first, the relation of nomadism to archaism.

*Natural Determinism and Some Limitations of Archaic Communities:
Between Stateless Communities and Subordination to the Formal Circuits of Capital's Movement*

Like sedentary archaic communities, nomadic bands (whether they are of recent formation, or they are those who in remotely mediated ways reach back beyond the Upper into the Middle Paleolithic) are stateless groupings, both living without overlordship, and without labor, a separate sphere of production and an economy, without even subsistence set asides. While nomads operate with base camps which they abandon seasonally, or in even shorter time frames, archaic communities form villages with permanent structures as dwellings (though they may on occasion, as often as two or three years, abandon these if resources dwindle).³³⁶ What fundamentally distinguishes the two forms of sociation is this: Nomadic bands have never existed in isolation. As small groups, they are too demographically thin to socially reproduce and sustain a human community; moreover, those considered in isolation (this or that band) do not exhibit social relations and institutions that characterize sedentary archaic communities (above all, the political as a non-coercive power that is embedded in, not separated from, the broader social matrix). Thus, they always form a system of groups within a region, where each can rely on others for, lacking a better term, intermarriage. Archaic communities, not all of them mind you, are demographically far denser and can (and have) in principle exist(ed) in isolation, at least relatively so (though they rarely do). From within themselves, they are capable of socially reproducing all the features which we characteristically ascribe to genuine human groupings. While nomadic bands are free (i.e., not subject to statism), it is with archaism that the possibility of a free, self-sustaining community for the first time in human history appears.

This much said, there is here tension in the analysis of the relation of nomadic groups and sedentary stateless communities to human freedom.

Because they generate a non-coercive political sphere of activity unifying themselves as communities, and because their being and existence counterposes them to the state (which is the institution incarnating unfreedom, masquerading its despotism under the cover of legality, and imposing both on the community, or society, thereby originally establishing and securing social relations of command and obedience), it is the latter, sedentary stateless communities, which are, as we just suggested, the measure of human freedom. Yet they can also give rise to large-scale societies which accumulate surpluses, exhibit hierarchies and in some institutional slavery, and are very close to becoming statified such as the Indians of the North America Pacific, along the James River, and the Georgian Bay region of the Great Lakes all at the time of "contact." (In this regard, see the discussion of Huron society which follows.) Thus, where they are egalitarian, it is nomadic groups which are absent the embrace of gender bigotry, have low population densities, and non-entropically live in, co-producing sensible and social forms with, nature, recognizing it as the real, concrete-sensuous dwelling of humanity. They embody a purer freedom.

Be this as it may, in either case it not all archaic peoples waxed and waned with the rise and fall of states; not all were previously sedentary cultivators who abandoned farming (and, in some cases even agriculture) and fled, reconstituting themselves as bands or communities, in response to statist assault and efforts at conquest, forced labor where conquest was achieved and, or demographic collapse engendered by pandemic disease. For long periods of historical time predating contact with settler colonists, none of this (i.e., a determinate relation to states) could be said of the archaic peoples who hunted (and some of whom still hunt) in the Siberian and North America Arctic regions, the plains Indians of North America and the entire vast region between Hudson Bay to the Rockies or the aborigines of

³³⁶This, however, is hardly "nomadic" behavior. It, in fact, has contemporary capitalist analogs in individuals and families who "migrate" to new or different locations for work or in search of it.

Australia;³³⁷ moreover, it should be clearly noted that where nomadic groups are, so to speak, left to themselves, they have as we noted formed expanding networks constituting a large-scale, geographically dispersed community that insures the social reproduction and viability of the small nomadic groups.

So consider, second, the problem of gender inequality and its relation to the transcendence of natural determinism.

It is tacit in the foregoing that the absence of the state defining archaic communities is not, we stress not, identical with absence of all social division. For sexual division appears in some unitary communities this side of the formation of the state (i.e., in archaic communities) as the structural principle of their organization. Above all, this is endemic to and most visible in non-statist communities that rely heavily on hunting. (Without exception, the individuals who constitute, above all the men, these communities believe social reproduction would be impossible without hunting.)³³⁸

This is particularly apparent in the Amazon Basin forest communities studied by Clastres, particularly the *Achei Gatu* (Guayaki). Here, the material culture of the communities, its fundamental implements as it were, simultaneously reflect and express this basic division. Embedded in and shaping the social practices of the community the bow is the masculine principle, the basket the feminine; the twain do not meet and there is no middle ground, no synthesis, simply no other principle as the rare case of the appearance of a homosexual (a male who prefers an existential relation to a basket) testifies.³³⁹

...The necessity and desire for meat,³⁴⁰ cloaked in the (demonstrably refutable) inadequacy of the forest to provision the community from foraging (fruit, hearts of palms, roots, berries, honey, grubs or larvae, etc.), justifies the practical, mythically-cosmologically sanctioned, supremacy of men: The original people, the *Achei Jamo pyve* rose, claw their way up like armadillos, from within the Earth to its sunlit surface. The tunneling climb incarnates the conviction of fundamental difference between the man and nature, for it symbolizes the ascent from animality to humanity. The myth is confirmed, constituted and affirmed, for it is relived, in every birthing of a child. In the act of birth a woman, having nurtured the fetus-infant in her womb, tears it away from the earth (nature) in birthing it, but in cutting the umbilical

³³⁷With respect to disease, compare the foregoing with footnote 618 and the text referenced at this point, above.

If we set aside the regions where agriculture, and then on its back civilizations, first appeared and regions to which these civilizations reached out toward in conquest - for example, all of Mesoamerica, the Yellow and Yangtze valleys and as Chinese civilization developed the entire region south into peninsular southeast Asia, the Andes Mountains in its central reaches stretching east toward the tropical forests, Mesopotamia eastward toward the Zagros Mountains and (north)westward into Anatolia, etc. - right down to the era of capitalist modernity, *throughout* the world there were in all likelihood archaic peoples, whether nomadic or settled, who historical existence had nothing to do with the cyclical rhythm of civilizations.

³³⁸"For a Guayaki there is no possible alternative to the role the group has given him: by definition and on principle his vocation is to be a hunter. As the mainstay of the community and the concern of each man's individual honor, hunting or not hunting determines the very limits of a society." Pierre Clastres, *Chronicles of the Guayaki Indians*. New York, 1998 (1972): 31.

³³⁹*Ibid.*, 288-296; 105, for the situation of the homosexual.

For the manifold situations of women: 31, 36, 37, 85, 120; 121-122, 268 (murder of old women); 183-184 (first menstruation); *Ibid.*, 225, 265 (relation of war to women); 231, 249-250 (murder of young girl as companion for spirit of hunter who dies in prime of life); 256-263, 267, 270, 271-272, 318 (murder of young girl in revenge killings, killing young females in almost all such cases); 279, 284, 286-287, 329 (taboo against eating family members of the opposite sex among the cannibalistic Guayaki); 38, 39 (for the total, all-encompassing reach and penetration of these opposed principles, e.g., the existential threat of a woman experiencing her first menstrual blood, after aborting a fetus, the birth of a child, in merely touching a basket or, alternately, a bow, etc.). "... [The] women's power is so strong that it can be harmful to men. To be a hunter, that is to say a man, you must always be on your guard against women, even when they are not menstruating." *Ibid.*, 287.

³⁴⁰E.g., *Ibid.*, 239.

Clastres (*Ibid.*, 279) asserts the "major portion of the food is produced by the men." This may be true, but if so it represents and embodies a prior choice, an original ordering of the community imposed by the men. Clastres is completely blind to this even as a latent possibility. He uncritically accepts this mediated "fact" at face value, and appears to believe that this fundamental rupture in the social fabric in no way constitutes a form of social division. His unconscious male bigotry is explicit: "The entire symbolic space of masculinity unfolds in the [specific] act... *jyvo* shooting an arrow and from their earliest years the boys are prepared to enter their normal place to full their natural role" (*Ibid.*, 279, 281). Of course, what is customary, "normal," is never "natural," but always socially mediated. Clastres' admiration for the Guayaki form of social organization with its opposed yet complementary principles redounds on almost every page. He, in fact, plunges ahead: He loudly proclaims the superiority of archaic communities on precisely this issue (that of social division embodying opposing male-female principles) to all statist forms of society. For this, see the first and last chapters of *Society against the State*.

cord and taking the child from its mother,³⁴¹ in then bathing and purifying it, men liberate it from women (symbolized by the mother), just as later ritual initiation will separate boys who have come of age from their mothers, freeing them as men to hunt. Hunting is central to the being of a man, the core of his humanity, to the mystique and the entire mystification of social relations that envelop the community like a dense fog:

*There is likely no place on Earth, and the Amazon forests in their southern reaches (Paraguay along the Rio de la Plata) with their wealth of vegetative and insect life were no exception especially during the period of the known existence of the Guayaki (circa 1550-1968), where gathering and foraging would not provide sufficiency.*³⁴² (This does not even take into account small animals taken by the women among the *Atchei*.) Clastres' account relies far too heavily on a single very small band of Indians, though, because of their seemingly radical demarcation of separate spheres of activity, the Guayaki readily and compellingly exhibit the inversion, mystification and hypostatization (both in social practice and in Clastres' theorization) of the situation underlying hunting as a primary human activity.³⁴³ The utter unreliability of hunting as the basis of immediate social reproduction at any rate renders Clastres and the Guayaki claims to the contrary highly suspect.

A similar yet quite distinct situation prevailed among the communities and confederations of peoples in North America before, during the initial presence and long after the appearance of Europeans.³⁴⁴ In the well-studied region of the Great Lakes, Algonquin and Iroquois (Cayuga, Mohawk, Oneida, Onondaga and Seneca) peoples were horticulturists, cultivating wild plants (including berry bushes and fruit trees, planting gardens with peas, herbs, etc.), while Huron peoples, who are of particular interest in this regard, were effectively agriculturalists, planting, tending to and harvesting most importantly maize, but also beans, squash and sunflowers.³⁴⁵ (Such practices presupposes a settled social life and, in fact, the Hurons were sedentary. They lived in large villages.)³⁴⁶ It was women exclusively who planted, tended and reaped the yield of these crops and, it was they who also readied them for consumption. While corn formed the basis of the Huron diet making up as much as two-thirds of the foods (including corn flour) consumed, the women also gathered wild berries, nuts and roots. In the growing season (roughly 150

³⁴¹ *Chronicles of the Guayaki Indians*, 24-25.

³⁴² For this, see the entire issue of the journal *Human Ecology*, 19, 1991; also see Gary Paul Nabhan, *The Desert Smells Like Rain*, Chapter 7, where, in an account of Papago diabetes stemming from the abandonment of desert farming, Nabhan discusses the wealth of nutritious foods found in that allegedly most barren of all regions in North America, the Sonora Desert.

James C. Scott suggests that, retrospectively, if "the epidemic-driven demographical collapse [in the Americas postdating the sixteenth century European presence] was anything as dramatic as now seems to be the case, foraging and swiddening would have been far more advantageous as an agro-ecological strategy, promising a higher return per unit of labor than fixed-field agriculture, now that so much land was unoccupied." *The Art of Not Being Governed*, 366-367 n. 6. The relevance of a prior state of "fixed-field agriculture" will become apparent shortly.

Among the Guayaki (and perhaps, we believe, them exclusively), Clastres (*Ibid*, 103) states men do both the hunting and gathering, that men "produce" while women operate in a sphere of "consumption" (cooking, child caring, basket weaving and making pottery and arrow strings, *Ibid*, 104), much on the model of working class life in the two decades following the last imperialist world war. (In this regard, too, we would note the entirety of that anthropology that takes its point of departure in the work of Claude Levi-Strauss, for which exchange whether of goods, women or words is the structurally basic social relation that constitutes society as distinct from nature, begins from a historically specific form of socialization, from capitalism and its exchanges, and ontologizes and hypostatizes this relation; thus, in Clastres too, there is an absolute separation of culture from nature, a point of view which the foregoing in its entirety demonstrates is incoherent.) He situates this radical dualism, ontologically as we said, "at the very root of the life of the tribe" (*Ibid*), though there is the contradictory suggestion that women too gather as well the explicit acknowledgment that they hunt small "game," coatis and armadillos (both of which were not, in our view, all that small). *Ibid*, 108.

³⁴³ See "Archaism and the Compulsory Labor of Civilization," above; and Laural Bossen, "Women and Economic Institutions" in Plattner, *Economic Anthropology*, 321-322, who recounts and exhibits among the Bushmen, for example, both the primacy of gathering (and this in a much more hostile environment than the Amazonian forests) and the cooperative (i.e., men and women) nature of hunting.

³⁴⁴ E.g., Bruce Trigger, *The Children of Aataentsic: A History of the Huron Peoples to 1660*. London, 1987 (1976), and Richard White, *The Middle Ground: Indians, Empires and Republics in the Great Lakes Region, 1650-1815*. Cambridge 1991, for before and during, and after respectively.

³⁴⁵ Trigger, *Ibid*, 100 (Iroquois); 34, 35 (Hurons); 231, 318, especially 448 n. 31 (northern Algonquin).

³⁴⁶ Villages ranged in size from perhaps 500-700 to 1,500-2,000. Population of the Huron homeland has been put at 18,000 to 40,000. *Ibid*, 31-32.

That homeland, Huronia, was formed by a small landmass abutting the central eastern coast of Georgian Bay. Today a waterway runs through its south end to the Bay detaching it from continental land and is known as the Georgian Bay Islands.

days a year), this was arduously work. (During the summer months, women with their young often lived in cabins alongside their fields to protect their plants against birds, rodents and small mammals who might otherwise feed on them.)³⁴⁷ Women also did the food preparation, cooking and sewing of clothing.... To be sure, the commitment to agriculture rendered peoples once engaged in hunting, gathering and fishing, no longer archaic. Perhaps more than anything else it was trade with the French that forever pushed them beyond archaism and remade them as something else, most visible in the activity of men... Men were self-consciously hunters and warriors (but no longer archaically so). No doubt at one time they hunted mammals large (e.g., deer) and small (e.g., rabbits), and water fowl (ducks and geese).³⁴⁸ Perhaps as late as the moment of Castilian decadence (first phase of the Thirty Years War), fishing (trout, sturgeon, pike) was still an activity men engaged in and in so doing made an important contribution to immediate social reproduction of the community. But, by no later than 1630, they were (non-archaic) hunters, trappers and traders who contributed almost nothing to immediate social reproduction (here food consumption); instead, and this is what distinctive about the situation of all the peoples of the Great Lakes region, they, the Hurons, were fully integrated into the formal circuits of the movement of capital,³⁴⁹ French capital (and were thus mediately bearers of the same social relations that knitted together the continent economy of the English Isles, Europe and the Mediterranean in the high era of the formal domination of capital over labor in production in its epoch sense): They murdered beaver (and badger, fox, lynx, marten, moose, muskrat and otter) merely for the animals' fur and traded it with the French, exchanging it for manufactured goods, *primarily* iron products and apparel, at posts along the St. Lawrence (Three Rivers, Montreal).³⁵⁰ To boot, Huron traders, men, used the corn surpluses generated by "their" women to exchange for beaver pelts among Algonquin peoples (and the Nipissing, Ottawa, Tionnotaté, Neutral), after they had driven beaver in their own hunting grounds to extinction. These were also exchanged with the French and, turning around, the Huron traded (bartered) French manufactured goods with the very same peoples for more beaver pelts.³⁵¹ While effectively exploiting the labor of Huron women, these trading parties thereby drew the latter more remote (more

³⁴⁷ *Ibid*, 36, and 100 for the Iroquois in which a similar social structure existed. Men grew a single specialty crop, tobacco (*Ibid*, 415), a luxury with a view to pleasuring themselves, and not feeding other members of the community.

³⁴⁸ *Ibid*, 31.

³⁴⁹ Eric Wolf, *Europe and the People without History*. Berkeley, 1982: 160-172; Trigger, *Ibid*, 544, 596-597.

By 1640, French officials also recognized Huron dependency, and they mercilessly used it to compel Hurons to permit Jesuits free access among them (*Ibid*, 567, 597-598). As missionaries, the Jesuits were... of course they were... fanatical and dogmatic ideologues, bearers both of epidemic disease among the Indians (*Ibid*, 590) and destructive assault on native culture (*Ibid*, 529-531, esp. 530).

The *coup de grace* was not just trade but the very presence of Europeans (French Jesuits) themselves, as bearers of bacteria and viruses for which the Indians – classless societies without domesticated animals, ducks and geese, pigs, sheep and cattle, hence lacking the millennia of contact and the acquired immunities – had no biological defense: Epidemics in 1634 (we suspect measles) ravaging the Huron, influenza in 1636-1637 killing perhaps 10% of the population, and smallpox in 1638-1639 (summer into winter) taking half the population and destroying Huron demographic integrity (mature adults embodying experience and skill, young children incarnating the future), as well as that of the Susquehanna, Neutrals and Seneca, *Ibid*, 499-501, 588-589, 602, left them too weak and bereft of the women who knew how to plant, tend and harvest, hence left them subject to famine and left them without skilled warriors to fight aggressions. It was these events that secured the French advantage over the Hurons, through provision of supplies including food and a political alliance against their native enemies.

Still this is not the same to say that, without the epidemics, the French would have been swallowed up in the masses of peoples on the North American continent (as does Scott, *Ibid*). This constitutes anarchist bigotry, a cognitive failure to grasp the objectified, reified character of capital's movement and the powerful pull it exercises on desire, not to mention the entrapment of need structure (manifested among the Hurons, Iroquois and Algonquin in their commitment to the fur trade). The incorporation of the peoples of the Great Lakes region into the formal circuits of capital's movement had gone too far. With or without the epidemics, in the end the result would have been the same, for abject dependency (the result of the epidemics) merely compressed the initial dependency that would have otherwise been complete, i.e., become hopelessly irreversible, over the course of historical time.

³⁵⁰ From very early on among the Hurons, apparel included blankets, cloaks, nightcaps, sheets and shirts. Iron products in part included arrowheads, hatchets, ice picks, kettles, knives, large needles and swords. *Ibid*, 358.

Among the Mohawks (though this goes doubly for the Hurons who were fully integrated at an earlier date than the Iroquois), there were "doors of hewn boards with iron hinges... purchased ready-made... iron chains, harrows, hoops, and nails" all visible "in their villages." Among the Mohawk, by 1644 "guns, swords, axes, and mallets were in common use" and "iron rods and chains" were also commonly possessed. *Ibid*, 617.

[The constitution of a continental European economy based on the formal domination of capital over labor in production is explored at great length in *Genesis of Capital*, Book I, Division II, Part V and Division IV in its entirety, Book II in its entirety and Historical Notes 3 and 4.]

³⁵¹ Trigger, *Ibid*, 336, 351-353, 354-355.

inland) groups deeper into the formal circuits of capital's movement. Here in stateless, but no longer archaic, communities there was natural determinism in a form very close to class formation.

The integration into the system of mercantile capitalist social relations was reciprocal and complete; reciprocal because the furs were an important component in apparel manufacture in Europe (among French, Dutch, English), and complete because the Huron (Iroquois, Algonquin) were by 1634 utterly dependent upon the trade not so much for amenities (obviously they were) but for basic material elements of daily life...

The basic Huron myths appear to invert the real relations among the sexes. Two fundamental supernatural beings, Aataentsic, mother of humanity and her son, Iouskeha, incarnate opposite principles: Iouskeha is responsible for creating the lakes and rivers abundant with fish, for good weather, for corn that grows, and for releasing the animals (from a great cave) which permitted themselves to be killed by hunters. Aataentsic spends her time undoing the human good Iouskeha has done. Yet they live together. One may wish to interpret this as an encompassing cosmological explanation of and compensation for the actual structure of male dominance and female subordination,³⁵² an expression of depth psychological guilt and admission that mythically affirmed the activities of women by having men perform them. But a-religious, fully integrated into social life in conceptually mediating daily activities, its rituals and ceremonies, and absent all institutional separation (e.g., a priestly caste, institutions such as the church and material structures, shrines, temples, etc.),³⁵³ lived and experienced as guidance the inversion itself affirmed the actual organization of social life.

In this respect the Huron independently reproduced the sexual division of the Guayaki at great distance and over greater time: Women did "most of the work, both at home and in the fields, while the men amused themselves hunting, fishing, trading, making war, dance and sleeping the latter being their favorite occupation."³⁵⁴

Among the Guayaki and Hurons, in all likelihood the unconscious integration of male supremacy into the mythologically formulated cosmological ordering of social life is incapable of explicit recognition. Nonetheless, this supremacy had a purely social character; it was reproduced in all the institutionally ritual and ceremonial practices (themselves justified in terms of that cosmological ordering), and it was this social activity and not the cosmological ordering of the world that secured this supremacy.

Here we would like to recall Moscovici,³⁵⁵ specifically his analysis of what he calls the fundamental law of human social life generally (the incest taboo). One need not accept this fundamentalism to recognize what is at issue. Highlighting this is not simply an exercise in analogical comparison, for the cosmological order in these communities and the incest taboo are structurally identical, socially embedded principles: They both systematically work against women. In the case of the latter, the only real incest is that of the mother (often penalized with loss of life, the father may be reprehensible but he just as often gets away with it), and the shortages of women which justify their exchange between men (in warring, in inter-group alliances) are all invented, thus socially created (by way of e.g., infanticide, monopoly of girls by elder males, revenge killings of girls and murder of older women as among the Guayaki, the taking of young women for marriage in raids and war among Guayaki, Huron, Iroquois). While the metaphor is stretched (not to mention entirely ahistorical), the intent it captures eloquently address the real issue: "In other words, it was forbidden to see the the rarity of women in archaic communities as an artificial product. If, starting from shortages, it was decreed a matrimonial law, all were inclined to consciously believe it was a question of shortages. Just as commercial traders provoke scarcity with the intention of raising the price of goods to maintain a certain level, commercially astute, the men did not, then, exchange their feminine goods because they were naturally scarce but contrived a social shortage in order to share them more to their advantage"³⁵⁶ (our translation).

Now, it wouldn't do to argue these were "lower" forms of human community, representative of animist forms of savagery, the latter itself an early stage in the human history. In fact, neither of the peoples

³⁵² As does Trigger, *Ibid*, 76-77.

³⁵³ *Ibid*, 75.

³⁵⁴ *Ibid*, 40, paraphrasing the observations of the early (circa 1603-1607) French explorer and trader, Samuel Champlain.

³⁵⁵ *La société contre nature*. Paris, 1972: 263-285.

³⁵⁶ "En d'autres termes, rien n'interdit d'envisager la rareté de femme dans société archaïques comme en résultat artificiel. Si elles ont édicté des règles de mariage à partir d'un manque, tout porte à croire qu'il s'agit d'un manque sciemment entretenu. La pratique du commerce, provoquant la pénurie dans l'intention de faire monter les prix on de les maintenir à un certain niveau, nous fournit un exemple ad hoc. Commerçants avisés, les hommes n'échangeraient alors pas leurs denrées féminines parce qu'elles son naturellement rares, mais les rarefieraient socialement afin de les échanger de façon avantageuse." *Ibid*, 272. And, in light of Huron practices especially those regarding trade, perhaps Moscovici's metaphor is neither stretched nor ahistorical.

discussed here were anything of the sort: They were not “our primitive ancestors,” people who had never risen to the level of agriculture and its accompanying civilization. This is patent in the case of the Huron, while the Guayaki had *lost agriculture*,³⁵⁷ i.e., had once practiced fixed-field agriculture but had given it up (and over generations and centuries, forgotten the practice) in fleeing the encroachment of the state, i.e., the Inca or bands of armed men, as representatives of the state (Spanish or Portuguese kingdoms). As is the case with many archaic communities in history, the Guayaki at their origins were fugitives, runaways from forced labor (corvées), enslavement, tribute collection, impressment, epidemics or any of these (or some of them in combination). More broadly, in the era of Castilian ascendancy (for purposes here circa 1500) outside the zone of the southern Amazon forest, sedentary agriculture was practiced in the southern Americas wherever it was possible.³⁵⁸

While exhibiting one paradigmatic, socially embedded “model” of polities without states and in this respect free societies,³⁵⁹ all archaic communities whose structure and organization is along lines determined by hunting (i.e., and negatively, where hunting is not fully subordinate to gathering and this subordination is not incorporation into the basic organization of the community) egregiously reproduce a form of natural determinism in sexual division. (We might say the fate of the Huron exhibits a likely fate of all male-centric hunting societies.) From the perspective of free community life, this is the limit of all archaic societies in which social reproduction on the basis of hunting is practiced. Class divided and statist societies, to be sure, qualitatively deepen hierarchy and social division, i.e., unfreedom.

Some Implications for Society Free of Natural Determinism

The foregoing brings into question, or ought to, that Marxist vision for which material abundance forms a necessary premise of free community. The vision was itself a presupposition of and the logical conclusion to the old statist and productivist program of the Second and Third Internationals. It belongs to Marxism understood as a theory of the development of productive forces. There are four considerations here. First, the enormous expansion of objective substance (i.e., plant, equipment and machinery; infrastructure and the urban landscape including dwellings insofar as each can be distinguished from industrial sites; and, the mass of circulating commodities) is solely a function of capital accumulation, of “production for production’s sake.”³⁶⁰ asses of proletarians have come to enjoy the fruits so-called of capitalist development *only to the extent that under the conditions of the real domination of capital over labor this development itself calls a higher level of well-being in order to more intensely exploit waged labor through the extraction of relative surplus value*. The same development necessarily has as its consequence the expulsion of mass of proletarians from production, the formation of a growing productively unemployable, unexploitable mass, which today constitutes a global surplus population, and which as capitalism confronts wrenching contradictions and crisis created by its own dynamics of development leads to massively increasing immiseration.

Second, in framing the issue and posing the question in this manner (i.e., in terms of material abundance) communists have historically framed and posed it wrongly: If we are to speak of “abundance,” then it must still be put on a new non-commodified basis beyond technologies of capital, beyond the production of value and beyond production that is obscenely profligate, extraordinarily redundant and abstract. Use values, just as commodities, are not “real wealth”: The relentless compulsion to reduce socially necessary labor (time) as the basis of the production of commodities ineluctably entails a reduction in product quality among the broadest range of commodities (the most common example being built in obsolescence), the elimination of all qualities of objects that do not enhance profitability and a homogenization all of which have their objective in creating and then satisfying needs of an abstract “consumer” (i.e., a generalized, statistically average individuality which is the exact counterpart to the Teil Mensch produced in abstract laboring). Use value is not to be counterposed to the commodity, for both are intrinsic features within and necessary moments of capitalism. The satisfaction of real needs, like the creation of genuine individuality, cannot be achieved on the basis of production that still carries the marks of abstract labor. Short of this, there can be no free

³⁵⁷Scott, *Ibid*, 132, 188-190; Clastres, *Chronicle of the Guayaki Indians*, 112-114 (a well-argued speculative historical reconstruction) and 135 (observations by the eighteenth century Jesuit, Pedro Lozano) and *Society against the State*, 85.

³⁵⁸ *Ibid*.

³⁵⁹See *Communism: The Historical Transcendence of Hierarchy, Social Division and Nature Determinism*, in particular, “Communism and the Political Community” (manuscript, 2008, 2011).

³⁶⁰Karl Marx, „Resultate des unmittelbaren Produktionsprozesses“ *Das Kapital. I. Buch. Der Produktionsprozess des Kapitals*. VI. Kapitel. Frankfurt, 1969: See the first paragraph at page 480 in Marx's manuscript pagination.

society.

Third, the revolutionary abolition of capital will generate massive destruction of objective substance, but as archaic communities *demonstrate* the reconstruction of this substance, and with it material abundance in commodified form, is not a feature of undivided free communities, much less a central one: The experience of free social relations embedded in self-sufficing and fully communal life remains qualitatively distinct and other, especially in the face of growing immiseration. This assessment, we shall self-critically note for now, is not exactly made from the standpoint of the archaic communities as sedentary, a determination we specified earlier. With respect to a dearth of resources, the proper comparison is between *nomadic* groups and the potentially free communities that emerge as proletarian groups carry out revolutionary action or, alternately, as abrupt and dramatic climate disruption deepens, culminating in the destruction of fixed capital, commercial and industrial landscapes; between nomadic groups leisurely appropriating the abundance of resources in nature and proletarian groups appropriating and consuming residues, that is the mass of circulating commodities, no longer regularly produced, as those groups' practice or, alternately natural transformation, dissolves them as a class...

To this moment we have specified the term "communism" as form in which a "free community" might be realized. Even the best revolutionary, liberatory and proletarian traditions do not achieve a clear concept of communism for which the latter takes its point of departure in the revolutionary transcendence of capital and aims at its own *immediate realization*; for which its content is to be found from the outset in working class hegemony over daily life in all its ramifications and dimensions; for which this power constitutes a *novel, non-separate and non-hierarchical council-based holding sway over the entire range of social activities* (production, distribution, consumption, etc.) as they are reintegrated into social life as merely functional aspects of sociation, a reintegration that is simultaneously a self-transcending, self-abolishing movement in which classes including workers as a class disappear; for which this power unfolds in a context absent a "transitional" period, and lacking halfway measures such as "workers' control." We have gone beyond these traditions (even at a moment when we still upheld them) in further indicating abundance has no meaning for a generalized emancipation if it is merely taken over from capitalism, that is, if it bureaucratically allocated, technologically manufactured and produced according to productivist principles (i.e., oriented to consumption by that abstract, statistically average individual, itself the product of the movement of capital). Obviously, the historical contingency of communism, commodity abundance (both of which have now been discussed) and in point of fact the disqualification of the proletariat as revolutionary agency distinguish both our concept and the historical reality of free community from those liberatory traditions. This disqualification is historically grounded in reconfigured productive processes that no longer permit *insight in the (societal) totality from within production*, in the declining political weight of industrial layers of the *Gesamtarbeiter* in world production, in global casualization and the disappearance of an oppositional workers' culture, in human (specifically proletarian) domestication and in our rejection of an incoherent metaphysics (i.e., theological dogmatism) of unconditional proletarian creativity.³⁶¹ Capital, its logic and its movement and its civilization, are all nonetheless destined to disappear as a consequence of abrupt, drastic climate change (itself generated and originally driven by the movement of capital) and emergence of a new Earth characterized by nothing less than a global dearth of resources in nature. In the maelstrom of this climatic disruption and transformation, worldwide production will shutter and global supply chains will crumble, trade will plummet abysmally and credit and money flows will freeze (to the point that paper money will be useful only for burning as kindling for warmth)... A *generalized* human emancipation is no longer possible... In the ensuing civilizational decomposition, generalized brutality organized by decaying states and bands of armed thieves and murderers, and demographic collapse will generate some isolation between population groups creating the possibility of formation of small free communities.

So that, fourth, historically, the foundations of free communities (and failing this, herein lies that great shortcoming of communist theorizations) at once start, among other things, from demographically small population groups, small socially undivided communities, the absence of social division that includes a fundamental gender equality that is often masked by the term "matriarchy," and the prior integration of society and nature (a premise that capitalism destroys albeit temporarily), on a geologically formed, natural abundance, a superfluity so massive that agriculture, a division of labor and, rising from these, a state are all pointless developments without ground in daily, social life. Where these conditions do not obtain, it is an open question whether free community can be realized, whether swiddening extreme-

³⁶¹ *Capital, Class and Consciousness*. St. Paul, 2020: "Anthropomorphosis of Capital and Domestication of Humanity" (2012) where each of these issues is addressed in some detail.

climate resistant plants, foraging, and scavenging the ubiquitously-spread remnants of capital's civilization can provide the foundations of an existence without labor or work...³⁶² The mention of a fundamental gender equality brings us to at least one glaring limitation of many archaic communities (the determination "many" is not quantifiable), which constitutes a point at which natural determinism reappears in them.

Note₁

Archaisms and the Compulsory Labor of Civilization

In *On Productivism*,³⁶³ we point out that members of archaic communities engage in work (the "labor" of gathering and hunting) for a little on average as two hours daily. The source of this remark was Marshall Sahlins, who in a 1968 essay stated 15 hours per week of work characterized "original affluent," i.e., archaic, communities. The specific reference was to the Dobe among !Kung Bushmen of the Kalahari.³⁶⁴ Sahlins, in turn, based himself on the analysis of Richard B. Lee, an abbreviated version which was presented in a very well-known work of Lee and De Vore.³⁶⁵ Lee presented his full analysis in a collection that appeared the following year (1969).

One can read the texts in question for oneself and, for that matter, the literature of supporters and distractors that it has spawned.³⁶⁶ Here we shall merely summarize what is crucial for the relations of archaism to "civilization," i.e., to stratified societies based on fixed positions in a division of labor, thus to statist societies in both their tributary (modern as well as ancient) and capitalist forms.

In Lee's account, the analysis is twofold both moments of which are quantitative; (a) there is an attempt to calculate the hours given over to hunting and gathering among the !Kung; and (b), there is a further effort to describe the nutritional value in caloric terms of the food consumed. Take each in turn.

(a) Other accounts suggest marginally more or somewhat less hours, but in Lee's analysis as he fully developed it at a later date the total average number of hours involved in all basic tasks of social reproduction is 42.3 hours per week.³⁶⁷ (This is an average between men and women, respectively, 44.5 and 40.1 hr/wk.) Social reproduction encompasses "subsistence" proper, that is, the actual time spent in hunting and gathering by men and women;³⁶⁸ toolmaking and repair among men; and, housework inclusive of food preparation and cooking largely by women. The appropriate comparison is to capitalism ... since it is it we are most familiar with... in which in its history work alone has ranged from 35 hour a week (in contractions where work was available) to 102 hours a week, without any accounting of the walk (or drive) to and from work, food cultivation in a small plot supplemented by market purchases (or, in contemporary times, grocery shopping) and meal preparation and cleanup, which taken together would add at least 20 hours a week to these totals. These would be the most minimal requirements.

(b) Nutritionally, the hunter-gatherer diet is more than sufficient in basic values (in particular, protein and carbohydrate derived from nut and vegetative plant life) and caloric intake. !Kung appeared fundamentally healthy; they live lives in length comparable to those average lifespans of capitalism in its heyday (in the 1960s), children, weaned late (until 3-4 years of age), know nothing of the debilitating experience of poor health due to e.g., asthma, obesity, spectacularly mediated inactivity that leads to serious physiological disorders later in life, etc., which afflict the young of large social layers under capitalism. The hunter-gatherer situation should be contrasted with the two nutritional extremes at which

³⁶²What is in question here is natural abundance and it alone: All other features forming foundations of free community are *de rigueur*.

³⁶³*On Productivism*. St. Paul, 2008: "Productive Forces: Constitution and Material Embodiment, Ontologization (Hypostatization) and Ontology of Labor, Relevant and Relative to Capitalist Development (to the Productivity of Abstract Labor) Without Meaning and Significance for PreCapitalist Society."

³⁶⁴"Notes on the Original Affluent Society" (1968) reproduced in *Stone Age Economics*. New York, 1972: 79-98.

³⁶⁵"What Hunters Do for a Living, or, How to Make Out on Scarce Resources", in Richard B. Lee and Irven De Vore (eds.), *Man the Hunter*. Chicago, 1969: 30-48.

³⁶⁶Among the former, the best are critical and include Elizabeth Cashdan, "Hunters and Gatherers: Economic Behavior in Bands" in Stuart Plattner, *Economic Anthropology*. Stanford (CA), 1989: 21-47; and Bob Black, "Primitive Affluence: A Postscript to Sahlins." N.p., 1992; for the latter (whose criticisms, often crude, i.e., individualist and bourgeois *a la* Robinson Crusoe, do not rise to the level of the former), see, for instance, Ted Kaczynski, "The Truth about Primitive Life: A Critique of Anarchoprimitivism," N.p., 2008. Black and Kaczynski were accessed online at <https://www.theanarchistlibrary.org>.

³⁶⁷Richard B. Lee, *The !Kung San: Men, Women, and Work in a Foraging Society*. Cambridge (MA), 1979: 278.

³⁶⁸The division of labor is far from rigid, with a good deal of overlap. Men gather as well, women participate in hunting. Their diets largely do not come from the occasional big game animal, but small birds and mammals cornered and killed by women; other living forms mostly taken by women, turtles for example, as well as eggs and insects constitute food sources. See Laural Bossen, "Women and Economic Institutions" in Plattner, *Economic Anthropology*, 321-322

individuals, in particular proletarians, have lived and bodily experienced in the same history of capitalism: Various degrees of malnutrition at one extreme and morbid obesity at the other, the latter based on market formed dietary regimes with the nutritional value of styrofoam characterizing merely the last 40 years of capitalism.

The quantitative determinations made by Lee were in the Kalahari Desert in southern Africa, one of the most inhospitable environments on Earth, and not the tropical zones of lush abundance where "labor" was actually considerably less. The analysis was based on four (4) weeks in July, a period during which the amount of work required is greater since the trees of mango nuts (the basis staple of the *!Kung* diet) closest to encampments had been picked clean and the time consumed in reaching those less desirable foods now further from the encampments increased markedly. Here we might also note, actually it is important to stress, that Lee's analysis and the measure of his quantitative determination was made in a desert setting, i.e., in a region of the world characterized by a dearth of resources; yet, the time devoted to work still remained qualitatively less than labor under statist, especially capitalist, conditions.³⁶⁹

These are obvious issues that render archaic communities "affluent" in the specific quantitative senses that they do not live on the edge, working long and exhausting hours for minimal caloric returns, are not near starvation, do not live short, brutish lives. In all other significance respects they are superior to statist, divided societies, inclusive of capitalism in its period of greatest technologically manufactured commodity abundance.

We can consider those other significant respects. They are qualitative, and they can be stated simply and concisely.

First, there is a question of the nature and quality of labor under conditions of capitalist production. We refer to the dual character of that labor, divorce from the means of activity and subjection to the compulsion to alienate labor, sale for a wage. Then, on this basis, there is the truly novel reality of commodification, where the entirety of the human reality is remade, the deleterious effects on consciousness produce at best a *Teilensch* without direction, without self-sustaining, self-enhancing desire. Whatever one says about work under conditions that are not capitalist (not waged) and, of course, not forms of statist coercion (e.g., slave labor, *corvées*), there is control, lived and experienced as such without thematic awareness, over the means of activity, and, most often over the rhythms, tempos and conditions of labor.

Beyond this, archaism offers the reality of a community in which labor is minimal, and in which it is neither subordinated to a master nor to an objective logic (that of capital); in which it is not alienating (where by way of contrast the wage relation reconstructs the human personality as objectively alien, as the bearer of a power, human creativity, that is detached from the person herself and alienated, sold, as the basis for asserting mastery and control over that personage). This entire, fundamental situation finds expression in the now objectified dimensions of human existence, themselves split off from the personal (as in emotional well-being, bodily fitness, cognitive capacities, etc., that are subjectively and objectively treated as distinct).

Thus, second, from the perspective of this abstract objectified personality, health and nutrition are unambiguously, in particular emotionally and physiologically, superior among archaic peoples when compared with peoples, strata and classes of statist societies, especially those that are capitalist.³⁷⁰ This situation rests on the full integration of personality into the daily life of the community and its social reproductive activities, in which life is not subject to a mean-ends calculative rationality of the market, social life is immediately and directly community life and lived "morally": The unity of society is achieved in mutual satisfaction of needs and mutual recognition of "rights" (a concept which itself does not arise in archaic communities) and is not sundered by a class or stratum of exploiters and oppressors.

Third, archaism appeared first in human history with massive resources in nature (at least relative to human population densities) without any dynamic of technical development; capitalism today (and as well the near future "society," free or otherwise, which takes capitalism as its point of departure and assumes it as its patrimony) appears in human history with those resources in nature disappearing yet on the basis of a massive, institutionally separate technological development.

Even as the resources in nature vary as opposites and as the technical development is vastly different, in the grand sweep of human history, archaism demonstrate the different possibilities for human existence,

³⁶⁹A similar contrast holds for historically late Papago farmers. Their practices have transpired in intervals, periods of full days, determined by and following on 4-6 annual rainfalls. Here the concept of work, much less "full-time" work had no meaning.

³⁷⁰See Cohen and Amelagos' summary, *Paleopathology at the Origins of Agriculture*, 586, 587, 588, 594, and the discussion in "Power and Agriculture," above.

that free community (of which communism forms one version) is not just a dream and romanticism, that the claims otherwise are ideological and bourgeois.

Moreover, archaism effectively demonstrates that this version, communism, is itself contingent, that is, the whole epochal development opening with agriculture at its origins, fixed positions in a division of labor and the emergence of a state, a development that occurs within geologically formed interglacial conditions and on this basis which capitalism brings into being abstract individuality, massive production of wealth in commodified form and gargantuan production of objective substance (industrial landscapes, megalopolises, and a mass of circulating commodities), are only historically contingent conditions of a free society and only because, once capital as capital (real domination in production) forms, there appears no other way.

Finally, as communities without production, an economy and a state that have naturally yet humanly overcome natural determinism (at least in the specific forms of institutional hierarchy and fixed positions in a division of labor), archaic communities counterpose themselves to statist tributary formations and, of course, capitalist modernity: They demonstrate the minimal requirements for abolishing natural determination and natural determinism in human affairs as they form in the infinite becoming of nature.

Note₂

Residue Questions

While we state a specific, if not entirely distinctive perspective on all the issues that are addressed in the foregoing (especially the geological and climatic setting),³⁷¹ there are questions which remain and which, accordingly, require most thorough treatment. Intertwined, they are threefold.

The first concerns the nature of the interlocking appearance and disappearance of archaic groups and the formation and destruction of states, especially large-scale civilizations; inseparably distinction is the issue of the length of ancestry of these groups; and finally, witnessing their absence of labor, production and an economy, there is the question of the geographical reach of archaic groups (i.e., the question of whether they by and large are restricted to zones of great natural abundance).

Take each in turn.

It appears that archaic communities have come into being as states have waxed and waned. We know of the obvious cases cited here, the Amazonian tropics (Clastres), the Kalahari of South Africa (Wilmsen) and the southeast Asian massif (Scott). Though *our analysis* is, if not exclusively then largely, *concerned with archaism at its origins*, the waxing and waning of states has found its immediate counterpart in the creation and decline of archaic communities, often formed from deserting army conscripts, escaped slaves, individuals and families fleeing epidemic disease, forced labor and villages overrun and destroyed in war by fighting (or marching) armies. This was the case among Amazon peoples (fleeing Portuguese and Spanish conquerors and Jesuit *reducciones*), and particularly true in the Southeast Asian mainland and its island archipelagos among the countless smaller kingly states that have appeared and disappeared until very recent times (i.e., until the moment of capital's real domination set modern imperialist great power expansion in motion).³⁷² North America too provides socially homologous instances: The Otomi peoples of Mesoamerica after the fifteenth century appear to have become archaic:

The Otomi were a fully statified people, inclusive of kingship and an empire with its capital built at Xaltocan (an isle in the northern most lake, Lake Xaltocan, in the Valley of Mexico, north northeast of contemporary Mexico City). A period in the thirteenth century constituted the height of their power.

Shifting alliances among various statified peoples in the Valley led to the collapse of their imperial hegemony at the end of the fourteenth century (1395). The Otomi fled Xaltocan eastward, eventually leaving the Valley of Mexico.

Their existence became submerged. (Thus, unlike other statified peoples there is no documentation of them in Aztec administrative records. since for the Aztecs the Otomi had no jurisdictional reality.) A seventeenth century traveler noted that they appeared to eat grasses, had little agriculture, little further in the way of clothing and a rudimentary material culture. Gibson comments the description was as true in the twentieth century as in the seventeenth.

In the missionary Catholic onslaught of the friars, the Otomi, the only people in the Valley region (and its immediate environs) that spoke their own language (and not Nahuatl) successfully resisted

³⁷¹The fount for this analysis is, however, Pierre Clastres and his *Society against the State*. New York, 1978 (1974). See also James C. Scott, *Art of Not Being Governed: An Anarchist History of Upland Southeast Asia*. New Haven (CT), 2009: 182-219.

³⁷²See, e.g., Scott, *The Art of Not Being Governed*, 127-165.

Christianizing, e.g., refusing to give up their language or to relocate to missionary estates, offering no funds to the churches (e.g., to support the friars and, or, secular clergy), etc.

Entirely uncharacteristic of the statified Indian peoples and the Spanish all of whom resided in towns, the Otomi lived scattered in the hills. Throughout the colonial period, they remained a diffused people, denser in and to the north (of the Valley) than in and to the south without fixed or integral territory.³⁷³

From the time of the Spanish conquest (1519-1521) and occupation in the early sixteenth century, the Otomi were already considered "primitive," and consciously disparaged as such. (Charles Gibson relates that in colonial times pulque, a common alcoholic drink, was known in three grades, fine, ordinary and Otomi.)³⁷⁴ 724 The dispersal of the Otomi following collapse of their empire led to their de-statification, eventually to their rejection of the state, to nomadism, to a loss of agriculture (or its rejection) in favoring of swiddening based on "grasses" (i.e., wild rice, other edible plants, roots and tubers), to an archaism that in part rested on a distinctive language and a culture strengthened by and in part rising from swiddening and nomadism, which provided them with the inner strength and integrity to successfully reject one of the great statified religions, Christianity...

We address the second question in stating expressly and unequivocally the reality and being of archaic groups is not all tied to historical becoming and passing away of states.

Here we do not simply intend to invoke a distinction that appears in the foregoing, sometimes openly, sometimes merely tacitly, a distinction between *nomadic* archaic bands and sedentary archaic communities. For, not only do said nomadic bands reach back to the origins of the earliest homo sapiens (in the technical literature known as "archaic" *Homo sapiens*) some 150,000 years ago, and not only have some existed continuously for over 30,000 years... the original peoples, "aborigines," of Australia being the case in point.. some archaic communities have existed *continuously* for the past 8,000 years, going nearly all the way back to the origins of agriculture and all the way back to the earliest, "proto," states... the Papago of the Sonora being a case in point.³⁷⁵

The lengthy ancestry is, of course, disputed, most vociferously by Edwin Wilmsen and James C. Scott.³⁷⁶ Consider their argument, which is, it should be remarked, exemplary.

Wilmsen tells us that, composed of well-known (and studied) nomadic bands, the Bushmen, Kalahari peoples, are actually various social groups who included Tswana pastoralists ruined by raids on their cattle herds (never large to begin with), by livestock diseases of epidemic proportions, and by war; and who also included army deserters and escaped slaves. The largest social groups were peoples, then, whose means of subsistence have over historical time been expropriated, their lives devastated. Among the pastoralists, activity was essentially reduced to "serf" like conditions in production, while all groups were forced to forage in the desert fringes. It was this dispossession and flight, then the foraging, that homogenized them.³⁷⁷ Well not exactly. Their nearly acquired identity was not completed until they joined a population, albeit small, of San-speakers, *themselves foragers*,³⁷⁸ whose language, culture and sensibilities they over time adopted (though Wilmsen does not put it this way, it is clear that this is the only sense that joining an established group of gatherers, and in so doing assimilating their identity as such, can have). It would be unfair and misleading if we did not also note that, first, the original San speakers had, according to Wilmsen, once done much better, having flourished by sales of ostrich features, ivory and hides to merchants, who themselves were, relationally speaking, class constituents of an entirely different social, statist social order; and, second, there is an internal social differentiation within the arid and desert communities: Some San-speakers are not really gatherers in the strict sense at all. They possess cattle, they are considered, if you will, well-to-do, and are taken for Tswana descendants. While other, non-San speakers who, lacking cattle, forage are considered San Bushmen.³⁷⁹ Thus, Wilmsen has it that, social perception assumed to be decisive, the San are really a social caste, one of recent historical formation, whose social stereotyping, "stigmatizing," or degradation over time has

³⁷³Charles Gibson, *The Aztecs under Spanish Rule: A History of the Indians of the Valley of Mexico, 1519-1810*. Stanford, 1964: 4, 10, 22, 30, 116.

³⁷⁴*Ibid*, 10.

³⁷⁵Nabhan, *The Desert Smells Like Rain*, 94.

Nabhan cites the archaeologist, Ronald L. Ives ("Some Papago Migrants in the Sonoyta Valley," *Masterkey* 10 (1936): 161-167), *ibid*, 94, 142, who, referring to spring called *A'al Waipiai* in today's Mexican Sonora, states, "It is reasonable to believe that this settlement, situated at a perennial spring, has been continuously occupied since man came to the area," which would, we add, place archaic hunter-gatherers there at least 12,000 years ago, if not far earlier.

³⁷⁶Wilmsen, *Land Filled with Flies: A Political Economy of the Kalahari*. Chicago, 1989; and Scott, *Ibid*.

³⁷⁷Wilmsen, *Ibid*, 85-133.

³⁷⁸*Ibid*.

³⁷⁹*Ibid*.

amounted to an "aboriginalization."³⁸⁰

Thus, a highly significant component of the form of sociation we have called "archaism" disappears (the intent is to disabuse us of the concept entirely), but only by sacrificing the analysis of determinate forms of activity, and social intentionality they embody, in and through which social life is reproduced for analytic categories revolving around societal perception and bigotries. While elements of consciousness clearly are a determinant in the formation of a social group, an analysis that largely rests on them won't do.

But there is another problem: This is the original San-speakers who are identified as foragers. In Wilmsen's (and James C. Scott's) account(s), they are surreptitiously present, the coherency of the account depends on their presence, *yet their origins are unaccounted for*. Without a determination of their origins, the account(s) begs the question of "aboriginalization." The fact that these (original) San-speakers traded with other social groups (merchants) is not criticism of their form of life as (hunter-)gatherers. It has historically been quite typical of gatherers, for example (as Scott himself details) across the entire southeast Asian massif, to have engaged in exchanges with merchant groups while holding the statist societies in which those merchants were embedded at arms' length, i.e., they engaged in swiddening and inhabited the uplands and mountains to avoid conscription, *corvées*, tax and tribute collectors, in general, registration, counting and assimilation into the rice paddy agriculture that constituted the basis of statist power in this region of the world for the entire epoch in the West in which capital's formal domination unfolded (circa 1190-1870), and longer.³⁸¹

That hunter-gatherer groups have either come into being or re-formed and broken up as states have waxed and waned is not at issue. What is, though, is method and (what counts for) evidence. As analysis ultimately based on face to face encounters (whether or not they never get beyond "observation" of "subjects"), anthropological and ethnological analyses will not permit themselves to engage in metaphysical abstractions (i.e., in evidentially ungrounded theorizing into which natural and historical contents do not, and cannot in principle, enter, producing theorizations independent of all possible subjectivities). This is to be lauded. But it also is severely (self-)circumscribed. Where it does not admit of evidence of another order, that which is fundamentally archaeological (and for which remnants such as middens contents, and reconstructed built environments, say, a village or a single structure within one, do count as evidence), it must remain agnostic with a view to origins. In point of fact, the rather surreptitious manner in which Wilmsen (and Scott) deal with-existing foragers (to whom runaways, deserters, outcasts, and others fleeing states and their dominant landed classes attach themselves) and *their origins* masks a whole set of problems that can only be examined archaeologically. In Scott, the problem, barely surfacing,³⁸² is intense, and more often than not where it should it does not even surface:³⁸³ The response, usually cavalier, has the structure of logical error that begs the question, or opens onto an infinite regress. We can, however, archaeologically trace sedentary archaic communities of (hunters and) gatherers all the way back to the origins of agriculture and the Power that appropriated its surpluses. We also know this, not immediately and directly but, in the form of an evidentially-based reconstruction and theorization that it gives rise to. Similarly, we can trace nomadic human bands as far back as modern human origins, *Homo sapiens sapiens* (45,000 years ago), and, as already indicated, far, far further. The only question, then, is the relation between nomadic bands and archaic communities. The connective tissue is statelessness. We have already considered it above.³⁸⁴ ...

We can approach this issue somewhat obliquely in consideration of our third question. The issue raised here is the geographical locales of various archaic groupings.

Now it has not been just the zones of greatest natural abundance where what we would be compelled to call free communities without a state have existed and could be found. In the zones of greatest dearth, for example, in the deserts of the Earth, archaic communities such as the !Kung of the Kalahari, the Papago and Kumeyaay of the Sonora, the Southern Paiute of the Mojave and the Pitjantjatjara of the southeastern reaches of the Australian Gibson where the very existence of these peoples... whose communities did not contradictorily integrate Power based on material surpluses accumulated through a fixed division of labor in agriculture... demonstrate that scarcity so-called need not generate material inequality and a state, Power. (Leading us to the reasoned conviction, that any geographical-productive zone on Earth may well have at some time exhibited communities with similar structure and

³⁸⁰ *Ibid.*

³⁸¹ Scott, *The Art of Not Being Governed*, 130-132, 178-219.

³⁸² *Ibid.*, 244, 245.

³⁸³ *Ibid.*, 373, n. 93 and 394, n. 61 where Wilmsen is discussed.

³⁸⁴ See "Natural Determinism and Some Limitations of Archaic Communities."

organization.) To drive the point home (concerning the question of length of ancestry), we can point (again) not just to the Papago but to the various archaic Arctic hunters the circle the globe, also having communities whose ancestry stretched back thousands of years, those of northern most Canada and its archipelago, Scandinavia, across Siberia and Alaska many of whom live in established, that is, sedentary, communities. The point is that none of them had even to content with states until the mature phase of capital's epochal formal domination (hunting bands in Scandinavia and Siberia in the chronological sixteenth century of the modern era), or early in capital's epochal real domination (late 18th century in Canada and Alaska).

But return to the desert dwellers. Some of these peoples were semi-nomadic or nomadic hunters and gatherers (Kumeyaay; !Kung, Pijantjatjara). Others were sedentary, formed undivided desert communities and practiced a restricted forms of farming. Consider one of the latter peoples.

Historically, the Papagos of the Sonora and their ancestors in this region (dating back as far as 8,000 years and reaching forward into the early twentieth century) practiced self-sufficiency - without a state, without stratified position in a fixed division of labor, without an "economy" in the institutional sense and without labor in the sense that productive activities organized the structure of daily life. Productive activity was never individual, but always based on the family (household) and mediately on a village community; situated in desert washes (where rainwater caches were created), dependent on downpours of 1 to 4 inches that occur 4-6 times annually, family fields were worked for short periods before and after each rain, and were worked reciprocally; there was no private property in this production (there was no practice to which a concept that did not exist could be related, there was no word for it); spanning so short a period (whether a season or a lifetime) labor was not determinate for daily life; when they occurred, disputes over fields were not settled with a view to rules and laws (again, a state did not exist), but by two elderly individuals who knew both the disputants and the land involved, and they were resolved through consultation without recourse to contest or a fight; a powerless chief was elected for life by the village (a chief whose only important task was undertaken with a settlement of a new wash, as he divided the land equitably according to family size between the various families), and a council of villages was convened to decide on the distribution of land when a family died out, while land itself normally passed on to a son or sons (in which case land was worked jointly) with the death of a father.³⁶⁵ A very similar analysis and assessment could be put forth for the Marakwet of what is today northwest Kenya.³⁶⁶ Here was one society, among many others, existing in a zone of greatest natural resource dearth and shortage, that nonetheless managed its own affairs without recourse to institutionally coercive power (state), that was not stratified, that did not engage in exploited labor as it appears in all communities and societies with a fixed division of labor, that nonetheless was capable of satisfying all its needs, which exhibited a rich cultural life embodied in ceremonies, rituals, song, dance and stories ("myths"), and, again, reaching back 8,000 years Papago communities did not confront a state to the early high era of capital formal domination, the US state (in the form of the army cavalry).³⁶⁷

³⁶⁵Edward Castetter and Willis Bell, *Pima and Papago Indian Agriculture*. Albuquerque, 1942: 124-130 .

³⁶⁶Brian Fagan, *Elixir: A History of Water*. New York, 2011: 43, 44, 46.

³⁶⁷We intend here one more, and polemical, note, this with regard to the forms of abundance which appear in human history: We might justifiably wonder why it is that on Marxists assumptions a necessary precondition of communism is an enormous development of productive forces sufficient to generate material abundance.

The undivided desert communities of the Americas, above all, prove in the historically efficacious sense that material abundance merely becomes the necessary premise of one form and vision of a free society. That is, given originally a contingency (i.e., capitalist development, and particularly its integration on a world-scale), material abundance through nature domination has only appears to be a step down the path to a free society because there seems to be no other way.

Thus, manifestly, it is no longer possible to consider mastery over nature as a non-historically specific category of human existence, i.e., as one valid for the totality of "prehistory."

Yet like the concept of productive forces, that of scarcity and its dialectical overcoming - abundance, are hypostatizations without ontologically real ground. The situation scarcity conceptually catches and fixes is, at bottom, the competitive and self-aggrandizing, exchange-based, and socially specific confrontation of egoistic subjectivities founding bourgeois society. See *On Productivism*.; "Productive Forces: Constitution and Material Embodiment, Ontologization (Hypostatization) and Ontology of Labor, Relevant and Relative to Capitalist Development (to the Productivity of Abstract Labor) Without Meaning and Significance for PreCapitalist Sociaion."

The concept of scarcity is an illusory, retrospective projection, that of material abundance an ideologically utopian, anticipatory projection. Both are constitutive elements of a social theory which rests on a false belief in a technological path to utopia,* i.e., one that gives rise to private property in production, the division of society into classes and, consequently, the formation of an organ of class oppression (a state), with the ascendancy of one class over others - all of which determines "what is produced, how it is produced, and how the products are exchanged" (Engels, *Socialism*:

Annex
The State
The State at its Origins

Certain communities may have been divided, hence, primitively stratified, at their origins, i.e., as no longer specifiable groups of humans emerged from animality. But reaching back to our origins, humanity also pursued another path, that of egalitarian nomadic bands. This is one great division that characterizes those origins; another far more recent is development of agriculture.

In history, there has been a singular event constituting an original innovation. This was the development of agriculture, an agriculture which produced reliable surpluses and with them, necessarily, a division of labor and an economy. This innovation creates the fracture in an once undivided community; that fracture, social division, counterposes a tiny stratum which appropriated those surpluses to the mass of community members who produced them. That stratum consisted in leading man and his retinue, a body of armed retainers and tribute collectors. (The former may perform both functions implied by the terms "arms" and "tribute.") This is the state at its origins.

The state appears as soon as a unitary community is torn by social division; that is, as social division (into estates, classes, etc.) is institutionalized, the state takes shape as a congealed, hierarchical social relation of command and obedience. This institution is the state.

States, then, are co-extensive with the histories of the communities on the backs of which they rise. Change or innovation at its origins cannot be introduced without upsetting an original stasis, and sustained dominion over the rest of the community requires the maintenance of the very means of the destruction of the original bond, armed force that can range in its most rudimentary forms from a small soldiery band to its most developed, modern forms that comprise a standing army, a bewildering variety of police and policing agencies, material adjuncts such as prisons, detention centers and camps, and coercive institutions of all sorts especially that of a judiciary with its array of judges, prosecutors and courts. (In this respect, the cop in the street is a personified invocation of the state in daily life.) In all states, and, to be sure, especially with regard to the modern, bourgeois state, this force is arrayed against the rest of the community to secure control over and dispossession of material surpluses. Thus, those who constitute the state or man its institutions hold a monopoly on practical violence.

The state, then, is simultaneously marked by the appearance of a stratum of functionaries or officials (to collect and count those surpluses, in later forms these officials are tax or tribute collectors). This stratum is attached to a ruler, ruling stratum, or ruling class. But under any and all conditions the state essentially concentrates armed force. No matter how sophisticated its forms of coercion, the monopoly of practical violence remains unchanged. This concentration of force is the essential, historical condition ensuring the continuity of rule.

The State and History, I

With the full onset of the last interglacial some 10,000 years, something new appeared, breaking with the 100,000 year old form of existence and sociation of anatomically modern man. This was the adoption of sedentary living following immediately upon abandonment of nomadism by some bands of gatherers and hunters in the ancient Middle East.

Though forms of human sociation have been numerous, from this moment forward we can identify and distinguish three major ones. Broadly speaking, they are the archaic, the tributary and capitalist modernity. The first is by far the oldest and longest lasting. Each is comprehended by their fundamental activities and the central social features that characterize them. They are not sequential; they have co-existed, all have appeared in modern times, archaism as late as the middle of the short twentieth century. It is only the latter two which are statist, and thus which will primarily concern us here.

State and History, I
Archaism and the State: A Contrast

It was at this moment of the abandonment of nomadism that agriculture, fixed positions in a division of labor, labor itself and economy first appeared in their most elementary forms. The state arose on the

Utopian and Scientific (1880), Part III, "Historical Materialism").

In other words, even as the rise in the level of productivity has overcome the facticity of this material fact (i.e., even as socially organized scarcity), scarcity is the condition that leads straightaway to domination. Conversely, its overcoming is a prologue to and necessary condition of a free society.

In any case, material scarcity as that term is understood in the capitalist world has never been the basis on which a historically necessary development of labor, stratified positions in a fixed division of labor and a state have formed.

back of the communities which exhibited this development.

The state in its tributary form stands out most visibly when contrasted with that which arose in a countermovement to its initial appearance, namely, the archaic community. Most characteristically, archaic peoples are absent a state, that is coercive political power. Archaic communities are egalitarian, lacking stratified social relations, engaged in gathering, fishing, hunting and perhaps some swindling; states are societally hierarchical, as social relations of command and obedience diffuse throughout their entire stratified structure and organization, those rising to the level of a civilization engaged in monocultural crop production.

Archaic communities lack coercive political power because they do not engage in labor and lack a sphere of material production, hence are also absent a division of labor. Contrary to civilizational bigotries, they are also characterized by a material abundance, and by social individuals who lack an elaborate need structure, are absent egoism and the extremely individualized subjectivity raised upon it. It these features which taken together render social labor largely superfluous. Patently, archaic communities do not know property, private or otherwise.

State and History, I

Ancient Civilizations as Tributary Social Formations as such

It is only a lengthy historical development, a good part of it if not hidden then not facily reconstructed, which brings us to a form of the state with which we are quite familiar. This is an ancient form which is tributary. (It has modern analogues, e.g., the Aztec, Inca, Ottoman empires, Tokugawa Japan and Tsarist Russia.)

Tributary formations are by and large characterized by village-based sedentary agriculture, administrative towns, a state which establishes itself in a town, and quantitatively larger and qualitatively denser populations. That state is identified with the personage of a king and in a more remote sense with his household, and is largely external to the daily life of the village communities (which often particularly in all ancient and some modern forms inhibits the penetration of capital through a regular division of communal lands). The village communities stand opposite the state which does not intervene into their day-to-day existence, but nonetheless oppresses them first and foremost by the extraction of tribute, then, in ancient world in particular, by the periodic conscription of labor to dig irrigation ditches and canals, later in massive construction of dikes and dams, and as tributary kingship reaches its civilizational apotheosis in construction of grandiose temples and burial sites. (In modern tributary formations, slavery, corvée labor, serfdom and other forms of coercion may also be important determinants of social life.) Once grain (or rice) agriculture historically appeared populations at once undergo that dramatic increase in both numbers and density. These populations are not atomized; the individuals are members of families, and these are basic constituents of sedentary village communities. The agricultural that is practiced is largely communal (small plots may have been set aside for individual families which are likely multi-generational; but fields are commonly worked together). It is the village communities, then, that is the subject of tribute collection.

Above the village level these societies are highly stratified, perhaps in some cases based upon class differentiation, material inequality is at once extensive and extreme. But before ancient tributary formations fully matured (appearing as ancient civilizations) and characterized a distinctive epoch in human history, divine kingship has appeared. Unlike its modern counterpart where a claim is made to godly legitimization and policy sanction (such as in the case of the Tsar), in its ancient form kinship descends directly from the gods, socially functioning to unify the various distinct communities. It is in this capacity that he (or, occasionally she) mediates the structure and imperatives of the cosmos to daily life (which is otherwise considered insignificant): Kingship secures earthly existence (good harvests, societal cohesion, victory against enemies in warring) inasmuch as, as divine, it participates in cosmological order, an order affirmed in feast days, festivals and ceremonies organized by the temple lords (priests) and in local (temple-based) cults... Writing in its various early forms has appeared, metals such as bronze and copper have become widely used in productive activities, and, as we stated, a monumental art and architecture (as in temples, pyramids, palaces, etc.) had already long "advanced" beyond its initial development.

Both ancient and modern precapitalist civilizations exhibit de jure statified forms of property in production while in practice the villages engage in monocultural crop agriculture (wheat, rice, corn) in which their lands are cultivated communally. Statified property is really an inadequate modern construction: The state is, as we said, identified with the personage of a king, and "property," that is, productive land and

the social wealth that working it generates, belongs (like his household and entourage) to that personage. This is significant, for it distinguishes all forms of kingship (even those that are not tributary) from the modern bourgeois state for which property exists, is obviously private, and which makes a hard and fast distinction between the personage of the Executive, the institution (office) he occupies, and the revenues of the state.

There is no conception of property as such in ancient tributary forms; while in modern forms, because the state is more institutionally bureaucratized and because modern strata (especially merchants) play a role in this form of sociation, there is some private property in production (say in movables, in merchants' inventory), productive land still formally and in all historical significant events and developments where "ownership" is at issue belongs to kingship. (This is quite clear in the paradigmatic case of modern tributary formations, Tokugawa Japan, Tsarist Russia, and the Aztec and Ottoman empires).

Finally, modern tributary formations differ from ancient forms in four ways; first, modern tributary formations include not only villages but small urban conglomerations, towns with a significant social layer of strictly town dwellers, especially merchants and artisans; second, in ancient forms the villages themselves constitute one homogeneous layer in the formation counterposed to other social groups, hence are themselves an element in stratification; while in modern forms social division, a hard stratification, even class relations, penetrate the village community itself; third, modern tributary state officials responsible for collection of tribute are, in a qualitative way, invasive, for the burden of tribute placed on subjects in all cases peasants was far greater, in many cases, e.g., Tokugawa Japan, Tsarist Russia and with the Aztecs, a huge portion of the socially necessary substance required to sustain the peasantry as human beings was forcibly extracted as tribute in order to support the expanded administrative apparatus of kingship and modern merchant classes, a modern army, its accoutrements, and a specialized weaponry, e.g., cannon rising to artillery, seaworthy fighting ships, etc; and, fourth, modern tributary formations exhibit a fantastic development of a bureaucratic centralism relative to the entourage and household of a divine king, essentially his family, a coterie of tribute collectors and a small unit of armed retainers, who reigned over ancient tributary formations.

State and History, II. Capital's State The Modern, Bourgeois State

The modern, bourgeois state mediates and overcomes conflicts between competing capitals.

The activity of individual capitalists is based on private property rights in production: Each capitalist decides what to invest, how to invest and what to produce by assessing his prospects for accumulation with a view to his chances in the market. He acts without regard to the impact of his choices on others in society, without regard to the built environment and the surrounding nature in which he operates, and without regard to the requirements of society as a whole. Commodity production is the central domain of the private sphere in bourgeois society.

Mediation of conflicts between competing capitals is required if "society" is to function at all, if capital is to be reproduced. In a logical sense, the bourgeoisie requires a state to resolve its internal conflicts: Mediation produces separate agencies, commissions, departments, etc., that are required for each particular domain or sphere of competing interests. Antagonisms are "harmonized," as these bodies formally group individuals (according to specific interests) and then are subsumed under a broader body, a structure that "harmonizes" those immediately beneath it. This harmonizing of interests in "society" by the state proceeds in an increasingly more abstract and general way, and in an utterly rarefied and completely formalized manner, until, pyramidically, a general interest in the person of an Executive president, prime minister, constitutional monarch) is constituted: The bureaucratized, hierarchical and centralized character of the modern state with its detailed division of labor is, institutionally, so formed. The entire process of the mediation of conflicts that inevitably arise as individual capitalists egoistically pursue particular interests and ends produces an involved, convoluted and arcane structure (i.e., the modern, bourgeois state) as a complex of social relations that have been congealed and hardened, i.e., institutionalized, and gives it as such, set over and against these conflicting private interests, a public, institutionalized and separate appearance.

Left to themselves, capitalists cannot organize society without simultaneously sundering it in several directions. The basic datum of capitalist self-organization is the firm. Without a state, capitalists, or capitalist firms, are socially anarchistic in the productive sense: Based on competition for sales, markets and market share, the relations are mutually antagonistic (even when they conspire to fix prices); left to themselves, their activity, and the logic of capital it generates (a system of social relations subject to a

cycle of boom and bust), necessarily lead to ruination of some firms, thus to displacement of wage earners, likely to social conflict and perhaps, just perhaps, a proletarian-based challenge to the order of capital. The state is the domain in which capitalist unity is forged, a unity laboriously worked out through efforts of professional politicians, a bourgeois stratum itself product of the capitalist rationalization of society. (The stability of any bourgeois regime, in fact, depends largely on to what extent this unity is achieved.) The state is the structure that enforces the general interests of the capitalist class against individual capitalists and their actions, and constitutes the arena in which a common program for capital is formulated, i.e., in which a minimum of class awareness is achieved. The state thereby allows individual capitalists to come together and to act as a class in the first place. It is an "alienated community" that incarnates a unity and commonality constituting an inverted, because violence-based, parody of a free polity and it concentrates that extra-economic force which in precapitalist societies once had been inextricably bound up with production. The autonomy of the state is grounded upon resolution of mutual antagonisms among capitalists.

For precapitalist forms of sociation, states are indistinguishable from the persons and entourages of the ruler. Even where the ruler's armed force consists in an army, his nascent bureaucracy in priests or tax collectors, this armed force and these minions, though employed in enforcing domination over the rest of the community, are not institutionally separable from the ruler but instead form his personal entourage or his household. The state itself has yet to constitute a distinct sphere separate from the totality of social relations of which it is a part. Only with the rise of a centralized, bureaucratized form in the bourgeois era has the state achieved an objective, institutional existence. The modern state, like science, first emerged in the West as a political form embodying the class unity of the bourgeoisie in its struggle against the old old order kingship. Once it emerged it took monstrous shape by forcefully assimilating pre-existing communities which encompassed various forms of family, sociality, and production, legalizing commodification of each and all of these spheres of social existence

The modern state is unique in its institutional and separate character, its appearance as a "public" force clothed in a sham objectivity that sets it apart from and over and against individuals and society, its alien otherness that masks its reality as an complex network of hardened social relations governed by the class teleology of the bourgeoisie and actually borne by individuals (themselves bourgeois) whose daily activities reproduce it as such. While any modern, bourgeois state may come in the short run to be identified with a specific historical personage, what distinguishes it from states that appear in other past epochs is a seeming efficacy, permanence and reality that render it at once objectively independent in relation to society and independent of any specific ruler.

Thus, it is perfectly correct to note that premodern, precapitalist states were rooted in a totality of human relations which were already hierarchically organized, that, in other words, this totality was already socially divided (in the form of strata, estates, classes) so that one group, a tiny minority within the community, exercising rule through control of the state, hegemonized all other similarly formed groups; that, moreover, the ruler and his entourage in their persons exercised this dominion, rule, or domination in relation to the community. But it is a wrongheaded, retrospective projection to insist these states were both depersonalized and institutionally separated from communities, and that they hegemonized them by standing over and above them. This is not possible unless the state achieved an institutional autonomy that is grounded, historically, in the rationalizing movement of capital.

Appendix
The Critique of Reductionism in the Sciences of Man

It is important to consider the human and social sciences specifically and not just the modern science of nature as their exemplar and model *in order that* we may demonstrate this relation of modeling (with regard to methodology, evidence and veritable knowledge) does in fact guide these sciences, exhibiting how it does, the self-misunderstanding these sciences engage in, and why this form of understanding nonetheless dominates the field. An instantiation which concretizes the entire complex relation can, and will, be provided. First, though, we restate the general problem.

For the sciences of man (psychology, sociology, political science and economics, and their subdivisions and auxiliary disciplines), the analysis of the human being is conducted reductionistically, that is, with reference to some ultimate, unilinearly causal, determining physical reality that is other and more fundamental than, underlying, human existence. By and large the standard strategy is to posit a one-to-one correspondence between events of the "outer" world and the "internal" events of human subjectivity (thought, affection, perception, etc.), an assumption known critically as the "constancy hypothesis." The latter are said to "correspond" to the former, while the former are ontologically weighted against the latter so that the former are said to be "antecedent" to the latter and, as a rule, *causally*, at least ultimately, "conditioned" or "determined" by the former (or, again, more crudely, the former is said to be the "cause" of the latter), since the former, events, objects, and processes of "the" outer world, in their aggregated totality form a completely deterministic system in which a general causality prevails based upon the substantial reality of the "object" as disclosed by modern physics (in physics generally, the mathematically determined spatial-temporal manifold, aggregately formed of indivisible, discrete elements, bodies in the Cartesian sense, i.e., the atom or its component parts).

Ostensibly the goal of these sciences is to understand the psychological and social relations of consciousness to society. To grasp them critically and fully, it would be necessary to work through currently dominant theorizations. This "working through" entails an immanent analysis. Our task can be enormously shortened by taking (as do these sciences) their basis, as they understand themselves, in the empirical scientific physiology and psychology. Here, merely to exhibit the model relation of physics to the sciences of man, we can proceed from the relation of the organism considered physicalistically to its immediate environment, examining the elementary autonomic reflex (the nervous system), and summarizing the results of research that had already been established before the middle of the last century. It is not necessary to rise from here, as the most fundamental aspect, through each new level to the organism as an aggregated whole in this relation. For, in pursuing such physicalistically reduced analysis for which man is in principle more or less basically if not completely understood, we shall be in accordance with the procedure of science itself.

We do not start with "physiology" for no one can: One does not, for example, peel back flesh, apply stimuli at several points along a nerve or at several nerve endings and, as it were, follow an impulse along a nerve fiber to the "subcortical center," then observe a response by the subject. Instead, one observes the sensuous behavior of a subject that submits to an experimental application of stimuli. On this basis, the problem is to uncover how the organism can enter into relationship with a much richer and more extended milieu than that which acts immediately on its sensory endings in the form of physical and chemical stimulations.

So we begin with the most fundamental vegetative responses, those that occur prior to and without any awareness or reflexive intervention, automatically or autonomically, by reflectively considering the realist prejudice that ontologically weights one group of phenomena over another, so that in examining perception we do not start from the qualitative appearance of, say, light (its brightness, and the color and shape of objects that may or may not be distinctly visible in it) but from the assumption of a "real" light that is never given in perception, never perceived, that we do not comport ourselves toward. Instead, the "real" light, i.e., electromagnetic wavelength of which visible light is only one modality, can only be understood and conceptualized as a cause acting on an organism, an unvarying and unconditioned antecedent.

In the theorization that underlines this assumption, light, for example, is a physical agent that impresses itself on my retina, another physical (here, an anatomical) object. The light as physical is decomposed, analyzed into partial moments for as many distinct anatomical structures that are found along an equally decomposed retina. These two realities then are said to *correspond* or are matched one to another on a point-by-point basis. The one causes the reactions in, stimulating, the other: Each place on the retina, for

instance, has a determined spatial "value": It is unified by a pre-established nerve circuit to certain motor muscles, so that light, in stimulating the nerve, merely sets in motion a mechanism which is ready to function. The retina is not witness to any object in its objectivity (as a unitary thing), for it is not even a screen reflecting this object but is instead an assemblage of discontinuous receptors that only register successive point of excitation across which the light as a wave passes. The successive excitations constitute a series of stimuli external to one another in time as well as in space. The retina's response, your or my seeing, is merely a function of pre-established correlations between nerve receptors and certain effector muscles. The reflex itself is the "action," understood mechanically, of a well-determined defined physical or chemical "agent" on a locally defined receptor which generates a corresponding well-determined reaction along a defined pathway.³⁸⁸ This is the classical theory of the physiological reflex.

For this conception to hold it is necessary that the micro-site of the excitation should set up a uniform reaction, that the stimulus (itself decomposed into its elements) should alter each specific anatomical structure of the physical object acted on in an ordered manner, and that the nerve circuit should be separate and distinct, for failing this it would not be adapted to the stimulus.

What do, in fact, physiological studies indicate with regard to these relations?³⁸⁹

First, the local topography of an excitation does not determine the same unvarying response, and different locales of excitation can determine the same response... Here, it might already be suggest that it is the organism that renders a complex stimulus something other than the sum of its parts or elements... Second, there is no defined pathway, one constituting a separate and distinct conduction process wherein the excitation passes to the reaction. This can be pushed further: At the extreme what we find is that any reaction can swiftly be substituted for another while the stimulus does not vary. This signifies that neither is a response to a stimulus that would require singular reaction. In fact, the moment physiologists attempt to examine less rudimentary responses, ones that are not simply organismic autonomic responses - responses that resolve a problem posed by the immediately surrounding environment, what is revealed are no longer simple offsetting or compensatory processes. In this regard, auxiliary hypotheses, postulates of inhibitions and control devices conceived on the model of the reflex arc are merely higher order attempts to salvage the basic theorization.

In a more general way, the following conclusions are warranted.

Autonomic "reactions" are responses to a global situation of which *form*, such as movement, rhythm and spatial arrangement, is characteristic. In this relation, the reflex is not a response to those agents, "excitants" that "stimulate" and determine the nature of responses, as the sum of stimuli but, instead, is a response to a constellation, a totality, in other words to form, that gives its momentary meaning to each of the specific, localized excitations.

More broadly and re-theorizing, it can be said that prior to systematic explication (itself determined by the realistic and reductionist analysis), a recounting of *known facts* demonstrates that the outcome of an excitation is determined by its relation to the whole organic state as well as to the simultaneous or preceding excitations, *and* that the relations between the organism (generally, not just man) and its milieu are not linearly causal but are relations of circular causality.

It is reasonable to inquire, "To what end does the organism vegetatively or autonomically respond in this holistic and teleoclitic manner?" Generally, the organism (again vital life inclusive of man) at every level at which it functions seeks to preserve a dynamic state of equilibrium in the interests of self-preservation, self-maintenance and self-enhancement. It is precisely this autonomically purposive behavior aimed at equilibrium that renders the organism capable of improvising more or less adequate reaction

³⁸⁸For the descriptively physiological aspects of this discussion and their immanent critique, see Maurice Merleau-Ponty, *The Structure of Behavior*. Boston, 1983 (1942): 7-128.

³⁸⁹Three typical examples of such studies may be summarily elicited:

First, the excitation of the region of maximum visual acuity of the eye (macula lutea) will generate localized sensations, those such as "in front," "to the right" or "to the left," that are dependent on the relation of the eye to the orbit as well as the relation of head to the rest of the body. Similarly, excitation of one receptor, cells or groups of cells receiving stimulus, can call forth *different* reflexes while the excitation of two different sites or places can evoke the *same* reflex.

Second, a decerebrate cat will swallow water as soon as it is poured into its pharynx, but if a few drops of alcohol are added the cat's tongue will move about and the animal will double up. The action of water with the added alcohol cannot be explained in terms of one or the other taken alone as they should, that is, in terms of a one to one relation of stimulus to response. Yet chemically water and alcohol do not form a new combination that can act differently than the components additively.

Third, among certain octopi, following surgical removal of the cerebral ganglia, and part of the central ganglia, the two halves of the body insufficiently cooperate, the lability of behavior is raised or, on the contrary, extremely lowered, and coordination of movement of arms is compromised.

substitutions, call it, if extensive, a functional reorganization. At this level the organism is predisposed to re-institute certain preferred states, because they re-establish equilibrium. These states can be said to constitute the *objective values* of the organism that are specific to, belong as it were, to the organism as a vital being as such (or, as in "man," socially sedimented, historically constituted and historically changing objective values that belong to her as such). They are not external, imposed or "anthropomorphic." We are justified, then, in characterizing behavior with a view to these preferred states, as behavior that is ordered or disordered, that is significant or insignificant.

Thus, we can say the receptive motor part of the nervous system can no longer be understood in terms of independent partial elements, the structure of which taken together would be established before they enter into relationship with each other or with the organism's milieu generally.

Counterposing this conception to the classical theory, we can further say there is simply no basis for treating autonomic responses that are qualitative as mere appearances, while designating (actually presupposing) those that do conform to this theory as real.

Return to those objective values of the organism that are features of it as a living being.

In the classical theorization, the reflex exhibits normal activity of the organism. This is mistaken, but recognition is methodologically precluded by the experimental means by which classic, scientifically modeled theory is constructed. Instead, the reflex represents a reaction from the animal (or human) generated to the extent it is subjected, and *subjugated* may in point of fact be more adequately descriptive, to functioning by means of separate parts... the intend to show these parts as basic units operating in isolation... and responding to the artificially created situation and isolated stimuli, not to the complex situations the organism as a rule encounters in its environment. That is to say, a response of this order corresponds to the behavior of a sick or mutilated organism or a pathologically behaving human, in which its objective values have been forcibly put into abeyance, to *laboratory behavior* where the animal or person is placed in an "anthropomorphic" situation... cats with their cerebellums removed or immobilized or octopi with a mass of concentrated nerve tissue surgically detached are *not animals as they are found in nature*... since, instead of having to deal with those natural unities that form the events transpiring in its milieu or its world, the animal or person must respond to certain physical or chemical agents that have a separate existence only in and for science.

The reflex so understood, then, is the product of a relation between a pathological disassociation characteristic of the experimental apparatus that is deployed for studying it and that apparatus itself. It is *not* a feature of the fundamental activity of the living organism or acting human being insofar as it is healthy (which, in the latter case, is not merely an affective-psychological category but, more basically, is *social*). It can be considered a constitutive moment of human behavior only to the extent that the latter is the expression of a fully internalized and assimilated social norms that are essential anti-human, that are personifications of capital and its movement.³⁹⁰

If we were to pursue an immanent analysis of the so-called physical, i.e., physiological-neurological, basis of *higher forms of behavior* in their relation to society and the world, we could demonstrate that the functioning of the central region simply cannot be *coherently* understood in terms of the initiation of specialized mechanisms each one of which would be matched to a movement in space, but only as a global activity capable of bestowing the same typical shape and the same significance on movements which are materially unlike. If the higher forms of behavior, here behavior among humans, are otherwise understood and explained, then the "brain," itself conventionally and pervasively *misunderstood* as a physical object, as a centralized mass of cells and conductors, would not *contain* this behavior. *Behavior cannot be situated in infinitely divisible, homogeneous space in the Cartesian (i.e., modern scientific) sense.* Touch, cold and heat sensitivity, the experience of pain in its different intensities, muscular and bone sensitivities, none of these have distinct, much less spatially specific, representations in the cortex: They are not matched to site-based, differing nerve complexes, but form various modalities of functioning of the same natural substrate. That substrate as a coordinating center is not a determinant "place" in the brain to which sensations are transmitted, where "traces" are set down. From that moment they enter into specialized areas of the brain local points of stimulation distributed at the bodily surface undergo a series of (re)structurings that dissociate them from the context of "real" spatio-temporal events and the processes in which they were "really" engaged, organizing them

³⁹⁰Functioning by separated or isolated parts may be a luxury afforded humans that appears late in ontogenesis as well as in phylogenesis. That is, it may be that "pure reflexes" can be found only in man as she is a being capable of detaching herself from the pressures of life and objectifying in principle any vital, affective or cognitive aspect of her own being, thus ignoring others. Though even this luxury is dubious because this functioning is behavior that occurs prereflectively, while the objectifying operations require fully self-conscious intending.

according to the original dimensions of vital and human activity: The natural substrate itself *orders* "stimuli," local "excitants," and in so doing orders them according to a strictly (vital or) human pre-objective lived logic that is irreducible, and is not comprehensible, within a physicalist matrix. (That physicalist world is itself an ideational product masquerading as "real.") The "brain" cannot from the outset be understood as a physical object located with the anatomy of a being itself situated in the uniform, infinitely divisible space of the modern science of nature (physics), an object of the traditional (i.e., objectivistic and bourgeois) science of physiology. *It can only be understood as an organ of a practical being, understood in terms of perceptually grounded behaviors, their immediate and direct ordering, structuring or configuring, and so understood only within the total context of the dialectical relation of that being's own pre-objectively spatial and temporal, generating activity to the sensuous world of humanized nature, and the social world inclusive of its sensuous-material aspect (the built environment) erected on it...* A coherent physiologically grounded psychology is impossible Return to the reflex. It is not an abstraction. To be sure, it exists, but it can only be understood and grasped as a very special case of behavior, observable under certain determined, laboratory or pathological, conditions. It is, emphatically, not the main subject of physiology... unless, of course, the latter especially as a physiological behaviorism is comprehended and explained as a form of bourgeois theory, an ideal development fully congruent with the real movement of capital in which nature is practically reduced to raw material in the production of a world of commodities, production aimed at the self-valorization of value (capital); fully congruent in the sense that it constitutes a moment of a theorization of a reductionist and physicalist metaphysics of the manipulation of men and women as abstract labor producing commodities for the purposes of generating (surplus) value; fully congruent with a societally pervasive subjectivity and personality of human beings who have become objects of states engaged in the pursuit of a bio-politics of population; and, a precise theoretical counterpart to biotechnologies of capital whose overarching aim is and whose very mundane practices attempt massive, invasive social control...³⁹¹

³⁹¹For the sense and significance of a bio-politics of population, see *The Critique of Science*, Final Study, Part III, "Drosophila and the Experiment in Genetics."

Entr'acte
Behold the World!

***Short Texts on Pandemic Disease and Capital, Renewed Imperialist World War and
Consequences of Abruptly Changing Climate***

Pandemic Disease and Capital
Pandemic Disease and Capital, I
A/H1N1, Some Remarks

Contrary to the characteristic argument put forth in virological accounts of all sorts, viral, and especially influenza, disease is not coextensive with the human condition.

As is universally recognized (without understanding its significance), viral infections are products of the circle of human-domesticated animal interactions. Thus, for example, the common cold (a coronavirus) has been derived from human relations with horses; smallpox from cattle; chickenpox from chickens; measles from pigs; and influenza from chickens, ducks and pigs.

There is an entire epoch of human "history" that predated the rise of agriculture and civilization (some 100,000 years following the emergence of anatomically modern human beings) characterized by a form of sociation (nomadic hunting) in which viral disease played no role. Beyond this still another form of sociation (sedentary hunting-gathering) has co-existed with and survived down until the advent of capitalist modernity (in socially isolated pockets that stood outside tributary statist formations, landlordism-based forms of sociation and still later capitalist societies) in which viral disease also played no role.

These, those communities without states, without agriculture in the formal sense, lacking in material inequality and lacking even in the rudiments of the hierarchical relations of command and obedience that push social development down the path of coercive political Power, *did not labor and did not by and large humanize wild animals* (i.e., domesticate them for food, for work, etc.).

Accordingly, these communities never developed the biological immunities that, like disease outbreaks of epidemic proportions, are also products of the circle of human-domestic animal interaction.

Proof, as it were, of this assertion can be seen in the sixteen and seventeen centuries epidemic sweeps over the course of a half century in which whole native populations in the Americas were destroyed due to epidemics of smallpox, measles, etc., whereas in Europe, the same diseases did not destroy the demographic integrity of population groups, killing "only" on average no more than seven percentage(7%) of Dutch, Portuguese, Spanish, and English populations:

The very diseases that destroyed the demographic integrity of native populations were not immutable biological facts. The genetically transmitted physiological immunities of settler colonists to common diseases such as smallpox in particular but also to measles, dysentery, mumps, whooping cough, chickenpox, etc., as well as the diseases themselves, were the product of millennia of the enforced impoverishment starting from Europe's rural masses. Those immunities were constituted over thousands of years as peasants lived in closed, close and shared quarters with their livestock, primarily cattle, pigs, sheep, goats and chickens. If cows or lambs provided warmth as peasants slept among or on them, or human mothers wet nursed infant motherless animals, it was because savage inequalities produced a situation in which one family had a cow and some chickens, while another had herds of cattle or sheep, for example, that numbered in the tens or hundreds of thousands. *Rooted in millennia of rigid social stratification and class division, disease grounded devastation was a culturally formed phenomenon: It was the immunologically congealed expression of the internal barbarity and criminality of class societies themselves...*

Viral, and bacterial, disease has emerged anew, i.e., in qualitatively more resistant, medically baffling and epidemic and pandemic forms, at the end of the twentieth century. This emergence of infectious disease and rapid spread is almost entirely the product of two developments within capitalism.

First, grounded in the industrial emissions-induced warming of the Earth, it flows from the spread of tropical and semi-tropic climate regimes northward and southward. As a result, viruses, some very ancient (millions of years old), that were once confined strictly to these regions spread also, particularly on the back of capitalist commerce where not just the movement of goods but people (including tourists) is understood as commerce.³⁹²

Second, infectious disease is the result of decadence in the common sense of the term (compulsive, mega-wealth pursuit among financial and rentier groups, signature and individualized fantasy housing

³⁹²Instances would include West Nile, and more recently Ebola and Zika

among the well-to-do middle strata in metropolitan centers). For example, the bacterium known as Lyme disease has likely existed in the United States a long time without, until recently, becoming epidemic. The disease is carried by the deer tick. A warming climate (itself product of two hundred years of capitalist based, industrial pollution) and an increase in deer, together in those areas where precipitation has also increased, have multiplied its number. In the metropolitan centers of contemporary capitalism, always suburban, hothouse economic growth often obtains. In these areas, the increase in deer is particularly notable in a man-nature landscape which is sought after by the well-to-do middle strata, a landscape formed and contoured by real estate developers: Fragmented forests, i.e., open tracts having land interspersed with strands of trees, provide more sunlight than a contiguous forest, and the additional light promotes leafy growth, thus providing browse for deer. With the deer come the ticks. In the autumn they drop off the deer. Mice and chipmunks provide the mobility that the otherwise largely immobile tick lacks. These rodents find ideal conditions for weathering the winter in the woodpiles and stone fences that the well-to-do create alongside and surrounding their homes, a feature no doubt of the romantically and unconsciously anti-capitalist ambiance they seek. Bringing in wood for those cold winter evenings when a fire is the order of the day, the ticks attach themselves to humans. The result has been a startling rise in the incidence of Lyme disease...

The appearance of a virulent swine flu virus (A/N1H1) in, it seems, Mexico City and its immediate environs is not a spectacular diversion from the various modalities of the crisis of capital, but instead is itself *an integral feature of that crisis understood as a crisis of capitalist civilization as such*.

The only surprise about this lethal influenza virus is that its main genetic components derive from pigs, not birds. *Wild waterfowl form the natural reservoir of avian influenza*. Having existed, likely, for millennia among ducks, this influenza has until recently had no harmful effects upon wild birds.

But, driven by capitalist imperatives, the mass production of "meat," in particularly chicken, has seen the generalization of the American Tyson firm's model of industrialized poultry production throughout the capitalist world, beyond the United States especially in China and Thailand.

In all these sites, the massing of birds (exacerbated by attempts to stem transmission of disease among them) has multiplied, by orders of magnitude, the opportunities for HN viruses to mutate. Enter A/H5N1, which in its current mutated form has become deadly to wild waterfowl as well (e.g., swans), and is now sweeping across the world (Asia, Europe, Africa, soon the Americas) following the seasonal lines of wild bird migrations.

Capitalist poultry production practices have (i) allowed avian viral diseases to spread rapidly, (ii) to mutate exponentially, and (iii) made the diseases endemic, i.e., ineradicable, in birds. The same can be said of pigs, the only difference being that whereas in an industrial poultry farm that operates outside Little Rock or Shanghai literally a million or more chickens are confined to tight, enclosed quarters, the industrial hog farms as they operate along, say, the Minnesota River on the edge of the U.S. northern plains confine tens of thousands of pigs, given the difference in size and body weight, to an equally restricted immediate environment.

In the pursuit of capital accumulation by way of a greatly enlarged worldwide markets for meat consumption (chicken, beef, pork), the scientific management of poultry and livestock based on principles of industrialized production is generating a qualitative amplification of the incident and scope of disease by massing literally thousands or millions of mammals or birds, respectively, in tightly enclosed quarters (birds on the Tyson model) where naturally occurring disease can run, uninhibited, through these populations at frighteningly rapid speeds creating virally mutating highly pathogenic, potentially pandemic viruses. At the same time, industrialized methods of slaughter, in particular the organized massed animal murder on high speed, highly rationalized assembly line operations guarantees that unsanitary nature of the "product" through transmission of blood and feces in gutting, butchering and carving, thereby giving rise to life threatening strains of antibiotic resistant bacteria (*Escherichia coli*, *Campylobacter*, *salmonella*, *listeria*, etc.)...

There are, minimally, five conditions for constitution of a pandemic disease.

First, the virus must be transmittable among human beings. Second, the virus must be new, a mutation of existing viral forms to secure for it inadequate immunities within its host or their absence altogether. Third, not only must this novelty be something that is not easily combated by the host immune system, it must be capable of sufficiently weakening that system to render the host susceptible to other serious disease... in humans perhaps must commonly pneumonia. In other words, it must be deadly. Fourth, it must be capable of easy, rapid transmission within the host species. Fifth, the trajectory of the disease must be, at least until it reaches a point of generalization within the population grouping of its host, in the

direction of increased virulence as it spreads. (Pandemic disease runs in two possible directions, not just one. It is a common misunderstanding to believe that it always abates, simply running its course in a line of increasing "benignity.")

The last major *human* outbreaks of avian influenza consisted in A/H5N1 which first appeared in East China, Vietnam and Cambodia in early 2006 (if not before) and A/H1N1 in Mexico City in March 2009. The latter is by far the more dangerous.

In 854 new cases of pneumonia of indeterminate origin officially registered in Mexico City hospitals as of 26 April 2009, assuming these were *genuinely* cases of pneumonia), what was most disturbing is that a large majority of the deaths attributable to the disease (20 with certainty, 61 suspected) have been deaths of otherwise, young healthy individuals. Access to information on the ages of these individuals is hard to come by, but our relatively informed guess would put these victims nearly all at ages between 14 and 30. That is ominous: Human influenza as a rule strikes the elderly and the very young, i.e., those whose immune systems are either weakened by aging or not fully developed. (On average, 36,000 people, heavily weighted to the side of the elderly and the very young, die each year as a consequence of contracting human influenza in the United States alone.)... What is ominous is, first, that swine influenza, with its descent traceable back to the 1918 influenza pandemic (H1N1/1918) has been remarkably stable in the genetic sense up to, say, the 1997 Hong Kong influenza outbreak, but has become much more unstable, unhinged by potential for rapid genetic mutation given with the generalization, we believe, of the industrialized slaughter of massed chickens and pigs on a grand scale... What is ominous, second, in the truly, if to our knowledge historically rare, virulent forms of influenza, is that an otherwise healthy young adult population is in the main the victim of contact with the virus. This is because the virus, incubating at an exceedingly quick pace like the 2007 Mexico City swine influenza, is able to work itself in the depth of the lungs, the epithelial cells of the alveoli (tiny sacs that "hold" oxygen "won" in respiration) before the human immune system can adequately counter its presence. The immunological response is inflammation (as in a fever), which releases a unique white blood cell, a protein called a "cytokine" among which "killer T cells" are numbered, cells that take aim at the body's own cells when virally infected. The capillaries that surround the alveoli (oxygen molecules seep through the latter to the former, returning to the heart from which oxygenated blood carried by the arteries is pumped throughout the body) carry killer white blood cells to the points of great lung depth. Dilating, the capillaries decant the killer white cells, antibodies and other immunological elements including enzymes that in the process destroy the varying capillaries that have carried them. As blood fills the lung, the body starts making a connective, fiber-ish tissue. The lungs become congested with this tissue, capillary residue, cell debris, as well as the various attack cells, the exchange of oxygen cannot take place... Essentially, one drowns in one's own blood. *Only the strongest of immune systems, those of an otherwise healthy youthful population can mount this type of immunological defense*, called a "cytokine storm," in which, starting from a virulent viral infection, the immune system effectively kills the personage of which it is physiologically part.

The problem with the designation, "pneumonia," is that it is not a specific disease, but a general characterization of several different types of inflammation of the lungs...

The classical locus, though not unique, from which our understanding of the truly virulent, deadly viral infection derives was the 1918 influenza pandemic. While it is still moot as to whether it had its origins in the trenches of the Western Front, in the U.S. Army hospitals of Kansas or elsewhere, it is indisputable that the massing of already ill, future victims in highly confined, unsanitary conditions was perhaps the crucial element for development of a rapidly evolving virus, and for its extraordinarily rapid spread.

In this specific respect, the barrios, shantytowns, ghettos and slums of the great metropolises of the world today... which are *the institutional and built environmental forms in which a fundamental tendency of capitalist development today is realized, the ongoing, growing expulsion of labor from production simultaneous with incorporation of strata "outside" the waged labor-capital relation*, what some (myself excluded) would call a product of capitalist decadence... are the precise historical counterparts to those conditions as they existed in the trenches and hospitals of the first imperialist world war. Viral diseases are today every much diseases of congested, destitute living as tuberculosis, typhoid fever or cholera.

The crowded, impoverished conditions of daily life that likewise tend toward the unsanitary as they exist in these slums, here Mexico City, reproduced a second time ideal conditions for pathogenic mutation. Like the structures housing industrialized mass animal death, products of the global movement of capital. These slums are laboratory experiments on the fast track of the evolution of highly pathogenic, potentially pandemic viruses.

Pandemic Disease and Capital, II
*Wuhan Coronavirus and Bourgeois Desire*³⁹³

Officially dating from 8-9 December 2019³⁹⁴ in Wuhan, China, COVID-19 signifies not just the appearance of a novel coronavirus (SARS-CoV-2), but the transformation of the human-animal relation.³⁹⁵ This, for three reasons:

First, the virus is vastly more virulent (i.e., spreads far more rapidly) than any other severe, viral respiratory infection which has appeared in modern times. Where the deployment of extensive state force to round up individuals (hospitalize them and impose a general quarantine on entire infected regions) is lacking (e.g., China in the first 5-6 weeks of its spread, Iran, Italy and, still undetermined but likely, the United States and Britain), the rate of transmission ranges from an order of magnitude increase every twenty days to a doubling every four to four and a half days.³⁹⁶

Second, the death toll far exceeds any other coronaviral epidemic. Though the mortality rate is not as³⁹⁷ high as SARS (9/6% of roughly 8,100 cases of infection), and certainly not as high as MERS (36% of roughly 900 infected individuals), overall COVID-19 is far more deadly. In the first two months of transmission, the mortality rate was 2.4%. However, as Chinese state authorities use of compulsion has limited rapid spread beyond Hubei Providence, as some twenty other countries have reported infections (with epicenters in Italian Lombard plain, countrywide in Iran and in the United States northwest) and with the global total of infections well over 100,000 (as of 5 March 2020), and the morbidity rate is climbing as the mortality rate has reached 3.4% having felled over 3,400 people. This lower mortality rate relative to SARS and MERS permits COVID-19 to diffuse through entire populations without burning itself out (i.e., without destroying its hosts, thus itself) and guarantees its absolute number of victims with exceed those two other coronavirus outbreaks by orders of magnitude (at least three, and most likely four or more).

It is, moreover, likely, to exceed those of recent influenza epidemics. In fact, without massive state intervention aimed at shuttering production and commercial consumption, lockdowns and banning of public gatherings of even the smallest sizes, exceeding the fatality rate (2.5%) of the 1918 global flu epidemic, this well could be the "big one." The repression necessary to control spread (as in China) is not, for reasons of historical practice and ruling class hegemonic concerns, currently available while public health infrastructures have been largely dismantled in North America and Europe over the past forty years. In almost all of Africa and in the Spanish (and Portuguese, especially the Portuguese, i.e., Brazil) speaking Americas, the same public health infrastructures, where they exist at all, will be unable to cope with an outbreak of the virus if it makes it way into any country in these regions. COVID-19 is effectively a global pandemic. It will not seasonally abate (it has proven it can survive at 37° C), and less China, Vietnam, Thailand and Taiwan (and both Koreas where testing with extensive high, viral specific sensitivity has been undertaken), all of which have exhibited political will and the capacity (having in place public health infrastructures) to manage the virus, COVID-19 will wash over the world again and again (say for the next three years) until some sort of partial immunities form. (Epidemiological experts in

³⁹³Originally penned 17 March 2020.

³⁹⁴[Virologist now believe... it is early May 2020... that the virus might have infected a handful of people in November 2019.]

³⁹⁵COVID-19 is the name of the viral disease; SARS-CoV-2 is the name assigned to the virus itself.

³⁹⁶These specific remarks are based on media reported presented online, the BBC and informal propaganda adjuncts to the US state such as the nightly network news outlets. While the BBC is notoriously ideologically-driven in all its foreign reporting, it is indisputable that Chinese authorities have engaged in massive roundups of all individuals suspected of being COVID carriers. The criteria for this repression is less well-known, though we do know that pharmacies have been required to report all purchases of over-the-counter medication for coughs, sore throats, etc, likely providing one basis, itself grossly inadequate and misleading, for who is infected.

Because these remarks start from official accounts, there is the ever present issue of credibility. There are other reports that differ drastically. The reader should search for, review as many as possible, and judge for herself.

[According to Canadian authorities, prior to state intervention deploying the "lockdown" measures various of which are familiar in the capitalist West, the rate of infectious increase in this country was every three days between 17 and 29 March 2020. John Campbell, reviewed graphic-related statistical information 8 May in his "Global Update and Canada." Accessed under "John Campbell" at <https://www.youtube.com>.]

³⁹⁷In Iran, the Islamic regime did not undertake any effort to close shrines and gathering places of the Shia pilgrimage site of Qom. Masses of people from Tehran made the pilgrimage, spreading the disease within Iran. To boot, pilgrims from Iraq, Lebanon, Kuwait and Bahrain to Qom became, it is believed, bearers of the disease have been responsible for the bulk of the infections in these countries.

Hong Kong and London expect it will reach 60% - 80% of the global population before that occurs.) Until then, i.e., until it is transformed into a permanent yet manageable disease of civilization (like smallpox, like mumps), or alternately a partially effective vaccine is produced, the virus will continue to spread (and perhaps reinfect) populations in larger or smaller waves.

Third, like other contemporary coronaviruses (SARS, MERS), COVID-19 starts from bats to which it is endemic (and harmless), infects another mammals and from here jumps the species barrier to humans. Like SARS (the bearer of which is a civet), and unlike MERS (which is borne by a camel), COVID-19 is carried by a pangolin, which *falls outside the circle of human-domesticated animal relations*.

The palm civet and pangolin are "wild" or "feral" animals which, like numerous similar bird species, squirrels, deer, beaver, salamander and crocodiles, turtles, snakes, rats, wolf cubs and even (imported) koalas, are kept live and caged for on-site slaughter and sale in Chinese open air food markets. The Hunan Seafood Market, ground zero for COVID-19 at its origins, offered some 112 animals (and animal "products") for the Chinese palate. The Chinese immensely prefer fresh kill to frozen meat; they prefer freshly murdered swine, cow or chicken to the industrially murdered, chilled or frozen then shipped forms of the same animal life. In Wuhan, bat soup (with the bat recently killed, and gutted but otherwise present in the soup) is a popular delicacy. In the wild animal markets, the lack of on-site sanitary facilities and the killing and gutting virtually with the accompanying blood, intestines and feces guarantees initial disease transmission from animals to human.

State-driven, China lifted itself out of its repressive, impoverishing landlord agrarian past in a quarter century. Yet the marks of the old regime remain: Refrigeration, while common in the newer dwellings in urban well-to-do, is unlike to found in outside pockets of wealth or, for that matter, in the apartments and homes of the vast majority of proletarians and in village farming families. Buying perishable food for daily usage, and a certain preference, taste if you will, is constitutive of the *mentalité* across all classes in China. It is considered better, proper and human (i.e., Han). Organic features of some animals, it is fancifully believed, enhance sexual potency (rhino horns reduced to powder, for instance), others it is similarly believed to have medicinal value (pangolin scales it is alleged promote blood circulation, stimulate lactation, disperse swelling). The same culturally diffuse awareness, however, regards animals as food, mere tools, or "things" people can do with as they please. To boot, live animal markets are a socializing setting. Laws, more recent ones with very stiff penalties, have long been in effect banning wild animal markets. These are as likely to be legislated away as gun laws in the United States. In other words, not at all.

But the issue goes deeper, for causation here is crucial to apprehending the long-term threat the virus poses to human health, demographic density and the social reproduction of daily life.

Prosaically the search for markets, and dialectically and concretely, the "pressure" of the law of value embodied in and driving the commodification of nature as "exploitable resources" is wreaking havoc, vastly upping, disease transmissibility. While we start from Hegelian assumptions,³⁹⁸ this is increasingly recognized on bourgeois scientific assumptions.³⁹⁹ *Habitat destruction and with it the loss of biodiversity* transforms forest, wetlands and marshes, and other settings on the Earth hitherto not subject to human

³⁹⁸Similarly, on modified Marxist assumptions, Robert G. Wallace, et al, "Did Ebola Emerge in West Africa by a Policy-Driven Phase Change in Agroecology?" *International Journal of Health Services*, 46/1 (January 2016);* and on otherwise crude Marxist premises by Michael Roberts, "Coronavirus: Nature Fights Back" (February 2020) on line at <https://www.thenextrecession.wordpress.com>.

³⁹⁹See, for instance, the following, both very recent: Rina Chandran, "Asia's Rapid Industrialization and Deforestation Linked to Deadly Virus" (11 March 2020) at <https://www.reuters.com>, and John Vidal, "Destruction of Habitat and Loss of Biodiversity are Creating the Perfect Conditions for Diseases like COVID-19 to Emerge" (17 March 2020). Access online under article title.

Both authors cite ecology biologists, authoritative bodies (WHO, UN Food and Agriculture, CDC), environmental monitoring organizations, (Global Forest Watch) and authors who've devoted texts to specific issues to indicate, though perhaps not in these terms, the rapidity of deforestation, road construction and urbanization are perhaps *the* crucial elements in the vast ingression of capitalist activity into the natural world which releasing new pathogens, generating and accelerating the spread of infectious disease starting from East and South Asia, and Central and Western Africa.

* Wallace, et al, demonstrate that IMF structural adjustment policy as a condition for development loans led to the collapse of public sector infrastructure (especially healthcare). The IMF (and World Bank) further facilitates the entry of large logging firms to clear cut forests (for large agribusiness capitals aiming at planting palm agricultural monocultures) and mining companies (digging for cobalt, nickel, and other ores) entailing the expropriation of small holders and sedentary foragers. West African agroecology and forest epizology were thus transformed creating a novel environment well-suited to fruit eating bats (among other species) which are the central reservoirs of Ebola in conditions in which public healthcare infrastructure has been dismantled. The results are well-known.

remaking (i.e., increasing commodification of nature) into monocultural cropland, into roads and highways, and into zones for construction of industrial, commercial and residential structures; it vastly simplifies (where not destroying) complex ecosystems; and, in so doing, we may have crossed a line, driven down the ecological niche and milieu thresholds so low that, statist interventions notwithstanding, these natural setting can no longer provide their own immanent barriers (their sheer density and inaccessibility, microbial viral predators) to transmission, cutting pathogens loose from their own very specific econiches while making ourselves available as a domesticated humanity as hosts. Even the wildest subsistence species are being corralled, and being sucked up into capital's market expansion of exotic meat. These include beavers, alligators, crocodiles, porcupines and bats. Witness the civet and the officially recognized as endangered pangolin. Site by site, region by region and species by species that Earth is plundered and denuded (in the sea as well as on land, one need only think of longlining and gillnetting). In bourgeois terms, the "value" of the residue has actually risen. Demanding access roads, logging and mining have historically led the way. Following them closely, perhaps more damaging, large agricultural capitals employ tree cutting timber outfits which carve up these regions, moonscaping forests (clear cutting by way of gigantic tractors that, chains affixed to tree trunks, rip them from the ground, canopy, trunk, roots and all), leveling hills large and small, filling in gullies, ravines and valleys, obliterating the diversity, complexity and organization of those forests, wetlands and other natural settings which otherwise limit pathogenic transmission, qualitatively increasing the chances of exposing, acquiring and spreading a new pathogen. Heavily armed with modern weaponry, organized poaching gangs scour these residue regions for the exotic...

What conclusions might we draw from the foregoing?

First, while an abruptly changing climate plays a role in the emergence of pandemic disease, it is the movement of capital which, driving the change in climate itself, plays the outsized role in not only the emergence but the spread of pandemic disease.

Second, biologically congealed socio-historically formed immunities, to the other side, play no role in deciding who is subject to the disease, since virologically pandemic disease is (a form of) novelty itself, that which has not been previously encountered. Here again, it is once more the movement of capital which is decisive.

Third, though a genuinely global pandemic can halt the automatic and autonomic movement of capital by shuttering thousands of sites of production across the world, throwing millions of proletarians out of work, sending international trade plummeting and freezing up credit, it does not constitute a coherent challenge to the other capital. Only conscious agency suffices, and there remains none. Accordingly, the bourgeoisie will find a way, no matter how much it stumbles and no matter how many lives are needlessly sacrificed, out the crisis a global pandemic might create. Not only will the movement of capital restart, and, once restarted, simplify and degrade immanent natural barriers to pathogenic transmission across species, this movement will deepen the frequency, extent and likely the severity of global pandemics.

Theses on Capital's Construction of Pathogenic Virulence

Between the forest and disease transmission pandemic proportions among humans, there is a series of mediations borne along by the logic and movement of capital, another entire dimension of pandemic disease, which the foregoing fails to come to terms with. The following is an attempt to rectify this shortcoming.⁴⁰⁰

The underlying causation of pandemic disease today (above all, SARS-CoV-2) is not revealed by biomedicine (whether genetics, virology, phylogenetics) or in the clinical course of treatment or forms of transmission of that disease; rather, it is to be found, first, in a vastly degraded public health infrastructure in capital's metropolitan centers or the virtual non-existence of the same in its periphery (the former product of forty years of neoliberal privatization, the later structural adjustment programs

⁴⁰⁰These theses are based on the following: Jessica H. Leible, et al, "Industrial Food Animal Production and Global Health Risks: Exploring the Ecosystems and Economics of Avian Influenza." *EcoHealth*, May 2009; Rob Wallace, "The Political Virology of Offshore Farming." *Antipode*, November 2009; John Allen and Stephanie Lavau, "Just-in-Time' Disease: Biosecurity, Poultry and Power." *Journal of Cultural Economy* 8, no. 3 (2015): 342–60; Robert G. Wallace, et al, "Did Ebola Emerge in West Africa by a Policy-Driven Phase Change in Agroecology?" *International Journal of Health Services*, 46/1 (January 2016); Mindi Schneider, "Wasting the Rural: Meat, Manure, and the Politics of Agro-Industrialization in Contemporary China." *Geoforum* 78 (2017): 89–97; Rob Wallace, Alex Liebman, Luis Fenando Chaves and Rodrick Wallace, COVID-19 and Circuits of Capital." *Monthly Review*, March 2020.

imposed by capital's global lending agencies),⁴⁰¹ and, second, in the agroecology, global supply chains, and industrial farming that characterize contemporary capitalism...

Recognizing that degraded or non-existent public health infrastructure was monetized (privatized), then vastly downsized and reorganized by a regime of individually unaffordable just-in-time clinical epidemiology (making it impossible to societally mobilize the requisite resources to response to pandemic disease), here we shall focus on the second, more mediately immediate level of causation.

Specifications of a general theory of capital's, in particular neoliberal, disease emergence (inclusive, certainly, of China) has the following elements including starting from the global circuits of capital:

1. Deployment of said capital expropriating (with state connivance) local smallholders lacking industrial poultry, pig and cattle concentrations (shift in ownership) complete with restructuring humanized nature that destroys regional environmental complexity that keeps virulent pathogen population growth in check,⁴⁰² which results in increases in both rates and number of consequent events.

2. Like fisheries, wild animal flesh worldwide has been increasingly incorporated into the formal economy as exotic foods and delicacies, largely because it is capitalized by the same large agribusiness firms that organize industrial production. As the latter impinges further and further on the forest, poachers, contractors and labor employed by industrial food capitals cut farther into what remains of them. Driven by this impingement and the clear cutting that either precedes or accompanies it, a massive population shift from these increasingly denuded once forested regions to the slums, barrios and shantytowns of the great cities of the world continues. Notwithstanding this movement, there is, ongoing, a rapid growth and rural town forming, belts around, thereby enlarging the world's metropolises. These are the peri-urban *desakotas* (city villages) or *zwischenstade* (in-between cities).

With a transformation of surrounding nature alone, by now "usual suspects" such as Ebola, Zika, malaria, and yellow fever, though they have evolved little at least relative to influenza viruses, have increasingly become regional threats. They have suddenly moved from spilling over into remote villagers now and again to infecting thousands in capital cities.

While many forest pathogens are dying off with clear cutting, planting of agricultural monocultures and the destruction (at best the loss to the once extant forest) of microbiotic, plant and animal life - the latter often host to those pathogens, ancillary infections that once perished relatively rapidly in the forest (if only because they had infrequent contact with typical hosts), now have a new lease on life provided by humans - coursing across populations made susceptible, nay increasingly vulnerable to infection and disease (without respect to whether those populations are urban or rural) by austerity programs and the dismantling of state regulation (see §6, below). Even as new (e.g., mRNA) vaccines, and more effective ones, appear, the consequent outbreaks feature greater spread, longer duration and the very real possibility of more virulence. Spread and duration are enhanced by another aspect of the (human) population of susceptibles: The epidemics today make their way global through international capitalist commerce, its networks of trade in good and travel by people.

3. Newly urbanizing landscapes at once function as local markets and regional hubs for wild food and global agricultural commodities that move on through. In other words, the expanding perturbation, increasingly integrated into global commodity circuits, functions as a transmission belt which moves these newly spilled-over pathogens livestock and poultry, and wild animals serving as exotic foods from the forests of what was an inaccessible hinterland, to regional cities.

With respect to wild animals as exotic foods, the major consequence is that forest disease dynamics, the pathogens' *Umwelt*, are no longer constrained to the hinterlands alone. Their attendant epidemiologies have become intertwined, lived and experienced across planetary distance and compressed in historical time. Bubonic plague appeared in the Crimea in 1346 and took four years to reach the shores of southern Sweden, while Covid-19 disgorged from a bat cave and, once detected in Wuhan, took three weeks to reach Europe and North America.⁴⁰³ Capitalist commerce, the movement of goods *and* people,

⁴⁰¹Starting from locales of the world with minimal or no animal health surveillance, or public health infrastructures degraded by structural adjustment loans stemming from IMF/World Bank loans or neoliberal trade agreements, Ebola, Zika, malaria, yellow fever and African swine fever have become regional, transregional and global threats, a reality that neatly dovetails with rural landscapes that feature unregulated agribusiness capital pressing, not just the remaining forests, but peri-urban slums.

⁴⁰²For instance, said practices beginning in the late 1980s transformed livestock farming by 1997 in Guangdong Province. Thereafter, with the consolidation of factory farming, the frequency of pandemics grew qualitatively. Similarly, Mexico - though in a narrow temporal frame, 1993-1997, i.e., the period of implementation of NAFTA provisions.

⁴⁰³Thought to have originated (in *this* era) in the Mongol plains of Central Asia where a center of burrowing rats had domiciled themselves, the plague was carried west by a Mongol prince laying siege to the city of Caffa (Feodosiya) in

plays *the* central role in all this, in particular in the accelerated temporal pace and global reach of transmission

4. Global supply chains are at issue here.

In general, these chains decrease whatever impediments to transmission had hitherto existed; instead a supply chain arrayed across multiple countries increases risks of epidemic spread. That chain guarantees said spread:

With its global supply chains, industrially commoditized agriculture (pigs grown in the US Midwest that are consumed in coastal Chinese cities, chicken that incubate in Guangdong Province and in farms surrounding Bangkok and are consumed across North America and Europe, etc) is a motor of, the nodal points along those chains through which, pathogens of differing sources move from distant, seemingly inaccessible reserves to the truly cosmopolitan population centers, the Hong Kongs, Londons and New Yorks of the world, and along the way to their affluent suburbs not to mention that less renowned, other great cities of the world and their surrounding suburbs.

Similarly, wild animals become exotic foods and delicacies. Here the longer the supply chains and the greater the destruction of the forests these wild animals are originally resident to, the more various and previously unknown the animal pathogens that enter the food chain.

To boot, in all cases (wild animals, livestock and poultry) converging along the supply chains of the great agricultural and livestock capitals (Cargill, Gold'n Plump, Tyson, Smithfield, etc) the probability that various viral strains can exchange genomic segments, generating a recombinant with pandemic potential, increase.

5. And industrial animal production is also certainly at issue.

The organization of livestock and poultry production demolishes obstacles to virulence and rapid transmission, and vastly accelerates viral pathogen evolution.

First, transmission. Large confined animal feedlot operations cram animals, pigs, chickens, turkeys, tens of thousands, into tight quarters accelerating the evolution of disease pathogens. Transmission occurs by way of the handling of animal waste; through the presence, easily accessible, of nearby ponds and small lakes (poultry); via open trucks which move animals from farms to processing plants; by way of contaminated shipping containers and workers' exposure; through the presence of carriers, e.g., rats and flees; and via ventilation systems that expel animal materials into the immediately surroundings

Second, in a Darwinian sense, industrial animal feedlot operations select for the evolution of both greater pathogen virulence and mortality, not just in people and livestock and poultry also. And that is a major, et hidden dimension of the dynamic of epidemic disease:

(a) Large-scale, industrial throughput creates high animal turnover and, with constant supply of incoming newcomers, equally provides an ever renewing supply of animals among which transmission can begin anew;

(b) large farm animal populations - overcrowded, concentrated and large farm animal populations suppress livestock and bird immunities, facilitate repeated infection, and accelerate spread among the animals themselves;

(c) with that ever renewed supply of susceptibles, high density (concentrated) confinement confers an evolutionary advantage on those strains that can run through the animal population the quickest. The absence of on-site reproduction facilities in industrial livestock and poultry, rules out natural selection which provides free disease protection. At the same time, (i) the production of animals slaughtered for food with nearly identical genomes, essentially genetic monocultures (thus, plants too, for instance, palm, wheat, corn, rice) eliminates immune firewalls which in genetically more varied populations retards spread (not to mention the immunological weakening consequent upon subjecting animal life to a regular antibiotic regime), and (ii) younger and younger ages of slaughter selects for pathogens which can won't succumb to harder immune systems.

6. Vastly accelerated by the Trump and his administration (using the Covid pandemic as cover, he signed two emergency executive orders which freed all owners of property in production from adhering to environment and other regulatory statutes in the interest of ramping up economic activity), understanding and knowledge of epidemic disease is restricted, suppressed and undermined by the tendential direction of agri-capital and the state: There are fewer and fewer state inspections of processing plants and farms,

the Crimea in 1346, spread along the caravan trade routes, and from there further spread along the routes of seafaring commerce radiating out from the great ports of call inland, first, in 1347 to Constantinople and borne by merchant trade rapidly inland into the Ottoman Empire (Turkey), to the Kingdom of Sicily, Sardinia, Corsica, Provence, the tip of the boot of the Italian Peninsula and North Africa as far west as Melilla.

statutory enactments restrict state surveillance, the same effectively criminalize journalistic and activist exposures, and agri-capitalists refuse and state agency suppress reportage on deadly outbreaks of potentially epidemic disease. The damages to individuals and social groups caused by consequent outbreaks are pushed off onto to wildlife and livestock and poultry, crops, workers, public health institutions and infrastructure, local and national government in the form of deficits and revenue loss, and, as a further consequent, restrict the development of alternative agricultural systems domestically and internationally. All this is intended, a matter of ruling class (or those elements of it which actually involve themselves in governing) *policy*. This characterization is apropos not just agricultural capital, but industrial and financial capitals as well. Who, after all, paid for the riskless speculation, so-called "moral hazard," in derivatives among hedge funds, brokerage houses and the great banks back in 2009-2011, or again today (autumn 2019 to the present)? It is, of course, capitalism as we know it.

The Drift toward Renewed Imperialist World War

Against the double backdrop of new technological inputs into industry and the appearance of capitals of historically unprecedented size and a series of agriculturally based, deflationary crises that characterized the era of transition from formal to real domination at its *outset* (1870-1914), modern imperialism emerged in the later in the long nineteenth century as national ruling classes, including some new social groups within specific ruling classes based on capitalist finance, began to feel pressure emanating from proletarian groups, or worker-peasant (or farmer) axes, that challenged the hegemony of capital at the level of power. To be sure, these pressures neatly dovetailed with specifically economic phenomena, seemingly products purely of the movement of capital, overproduction of agricultural commodities (wheat, cotton, rye), finished manufactured goods that could not be absorbed in the home market, a surfeit of idle capital.

In this sense, imperialist activity first appeared as a response to the inner dynamics of capital's movement, initially, at the national level, that is, as a response to development based upon cyclical movement of contraction and expansion, to a general rise in abstract labor's productivity, to concentration and centralization and to overproduction. While competition between capitals leads inexorably, both logically and historically, to concentration and centralization of production and the means of production, to increasing technological inputs to the labor processes, to, accordingly, enormous productivity increases, thereby to the real possibility of overproduction and asset deflation, and thus to a certain compulsion to attempt to realize value through sale in global markets, spurred on by the crushing brutality of absolute surplus value extraction it was the growing militancy, organization and consciousness of workers that finally pushed capitalists, hegemonizing the state at the national level, to attempt to resolve the contradictions in the domestic economy at the level of the world.

Modern imperialism, then, a historically evolving phenomenon, appeared at a certain level of capitalist development and organized the activity of capitals on a world-scale. Then and now, it is organized largely through national states: As imperialist activity has unfolded, it has led to the practices of ruling classes that defend their most important capitalist firms and national industries in the global arena. These practices are borne by states, the unity of diverse, otherwise competing capitals arduously elaborated and forged within institutional framework of polities. From the perspective of these *inter-imperialists* rivalries in the process of formation, these practices taken together amount to the construction of, to defend, "national" capitals, i.e., those core capitals which each state, that is the dominant ruling class social groups that act through them (that man them, that formulate their policies), deems necessary to the existence and expanded reproduction of the order of capital. *At the level of the world, states stand in for, represent as it were, national capitals.* In so doing, they utilize whatever means, economic, diplomatic and military being the most frequently resorted to, to defend and augment themselves, i.e., their core capitals...

The Great War, that is the first imperialist world war, failed to resolve problems, aporia and contradictions the reached back to the nineteenth century: Three depressions (1873-1876, 1884-1886, 1892-1896) had failed to solve the systemic problems of capital surfeit and overproduction, and had led to struggle over colonial territory, over raw materials (resources) appropriation and sources of cheap labor, over these territories as outlets for commodities whose value was unrealizable in the domestic markets and as sites of capital export all of which were achieved through direct colonial administration or international loans. Those depressions did nothing to devalorize the productive capacity of the competing powers, the United States, Canada, Argentina, Germany and Russia, amongst the largest agricultural producers.

The *first imperialist world war* had its roots in the struggle over colonial territory, over raw materials

(resources) appropriation and sources of cheap labor, over these territories as outlets for commodities whose value was unrealizable in the domestic markets and as sites of capital export all of which were achieved through direct colonial administration or international loans.

The struggle dated to the seventies of the nineteenth century, and it can be seen in Egypt where the French lost out to the British, in the African Great Lakes region where same great powers competed (e.g., Rwanda), or in central and southwest Africa where the Belgians and Germans were locked in fierce rivalry, in the Philippines (during the eighties) where the US and Germany were at loggerheads, again in coastal east China where all the great powers particularly the British, French, Germans and Americans strove for control, and where Russian and Japan fought a war (1904) for dominance of Port Arthur and over the Liaotung Peninsula. It was these fierce interimperialist rivalries that created the military alliances that were forced into play, became actual, with the murder of Archduke Ferdinand.

Exacerbated by the tensions, hysteria and xenophobia unleashed by war (themselves deepened by the Versailles Peace), by 1925, these problems began to reemerge more and more as a crisis of agricultural overproduction (wheat) forcibly reemerged. Beginning with the imposition of quotas on imports increasingly more restrictive, and more protectionist, measures were brought to bear, were utilized, to combat the various manifestations of the crisis as it unfolded. The contraction in agriculture spilled over sometime in late spring – early summer 1929 into industry, yet it was only the stock market crash in autumn 1929 that made the crisis both an object of public, national concern (Germany, United States) and that generalized its effects to almost all social groups and classes, the former following from the latter..

The Slump was the concentrated expression of the lengthy, *general crisis* of capitalism (whose beginning was marked by the outbreak of the first imperialist world war and whose end was demarcated by conclusion of the second). In the history of capitalism those two imperialist world wars, taken together with the Slump, defined the epoch of the general crisis of this system of social relations and characterized the transition from the era of formal to real domination globally...

With the U.S. stock market crash, the crisis became a deflationary contraction of existing values, especially values embodied in industrial equipment, plant, inventories and firms, a crisis with its own specific problems and logic, absorbing, changing and exacerbating the problems of declining agricultural production; that, with an enormous contraction in capital assets sharpening and deepening a mild contraction in industrial production (generating cuts in output and large layoffs), which, greatly exacerbated by reflex responses - protectionist measures beginning with tariffs devolving into foreign exchange controls and blocked accounts, currency devaluations, bilateral trade and regional trade agreements - that essentially brought a halt to world trade, after spring 1931 with the collapse of the Austrian *Kreditanstalt*, became a financial crisis as well, that, in turn, once again reverberated through the entire reified system of social relations, increasing stresses on it and multiplying those points at which a state might crack (within the framework of global capitalism, insolvency, seizure of power by a social movement of the right committed to autarky and war). Thus, on the heels of this collapse of inter-capitalist normality, trade wars led to shooting wars: The entire contraction and involution of inter-capitalist exchange and trade highlighted and aggravated domestically developmental tendencies that reached back to the origins of states as capitalist powers. They aggressively pursued extra-economic policies based upon a decided inability to resolve internal class conflict, on autarkic creation of hinterlands for production of raw material and foodstuffs and on similar regional domination up to and including outright conquest and genocide to secure, seizing and expropriating, raw materials sources,⁴⁰⁴ bringing them into direct and open conflict, in a word, renewing imperialist world war.

The Slump compelled ruling class groups domiciled in the state to incorporate it into the circuits of capital in order to put a floor on ongoing devalorization and revive business activity. Those measures included asserting state control over the money supply, separating deposit from investment banking and currency devaluation; setting floors on agricultural prices with financial support, extending credit and mortgage relief to farmers to avoid grain overproduction, and establishing a national agricultural policy that took farm produced commodities off the market thereby putting a brake on the overproduction that had drastically deflated agricultural prices; and intervention in the waged labor relation, institutionally the legality and legitimacy of worker organization, institution of a national, compulsory contributions-based

⁴⁰⁴Thus, in September 1931, militarists within the Japanese Kwantung Army militarily occupied Manchuria. During the ensuing occupation, Japanese capital poured in and industrialization in Manchuria marched in lockstep with that in the Korean north. Then, in July 1937, the Japanese army launched at full-scale invasion of China. Fighting developed between the Japanese army and both the Chinese Communist party led by Mao and Chiang Kei-shek's nationalist forces grouped around his Kuomintang.

pension drawn from wages, and an patchwork network of unemployment and workman's compensation in a systematic effort to boost "effective demand" (i.e., reconstitute working class consumption as a dynamic driving capitalist expansion). These measure were novel, for they effectively incorporated the state into the circuits of capital's movement.

The *second imperialist world war* was grounded in the foregoing situation. For not only did the Slump and responses to it deepen interimperialist conflict over trade (trade wars) and its terms, the autarkic solutions (Germany, Japan) effectively constituted aborted shooting wars (oft aborted because the overwhelming superiority of these great powers made open resistance impossible), but the return of the Slump in 1937, and those very responses obliquely, demonstrated the Slump had not ended.⁴⁰⁵ It was massive military expenditures in preparation for war, the construction of plant and equipment for a military armaments program, and with it the Keynesian commitment to deficit spending, that lifted the great imperialist power economies out of depression and closed the circle on the state's integration into capital's circuits...

Once capital's reflex response to the general crisis, the Slump, compelled injection of the state in the economy and, beyond this, its, *the state's, incorporation into the circuits of capital* as a product of that very movement, new imperatives, those of states as national capitals, asserted themselves. These imperatives have involved elements of ruling classes' historically constituted social interests and ideology, especially rabid nationalism, revanchism and irredentism.⁴⁰⁶

Thus, this new shape (incorporation of the state into capital's circuits) directly impinged on the manner in which those inter-imperialist rivalries developed and continue to develop: Inter-imperialist rivalry, conflict and ultimately war among states functioning as national capitals no longer had even the appearance (as for the entire period culminating in the first imperialist war and its twenties aftermath) of a simple, immediate and necessary consequence of economic-productive contradictions among competing national capitals, states, as in the first imperialist world war. This meant that *national rivalry with its necessarily accompanying geo-political and ideological moments became an element in the construction of the imperialist order itself*. Together with the struggle for markets and resources that characterizes national rivalries, geo-political and ideological considerations now began to bear directly and immediately on the course of imperialist activity as it unfolds to this day at the level of the world...

This was not immediately apparent at the outset of war itself, but it was decisive nonetheless: The US, for instance, supported Chinese Nationalists in order to wear down Japanese armed forces, first, to prevent movement south into Indochina and the Dutch East Indies (Indonesia) from where vital raw materials (particularly oil and rubber) necessary to the economy of the British imperialists and to the latter's war effort against Nazi-organized German imperialism, were extracted; second, to prevent, alternatively, movement north against the Far East Asian rear of the Soviets also engaged against the Wehrmacht; thirdly, to protect substantial American imperialist interests in southeast Asian raw materials (rubber and tin, tungsten, chromium, manganese, quinine, etc.); and, fourth, to buy time in order to militarily re-arm in the likely event of a two theater war... but was apparent, nay manifest, by the war's

⁴⁰⁵Wages increases won during the struggles of 1935, taken together with the shake-out (bankruptcies, bank closures, etc., and the consequent devaluation of capital stock), translated into a significant uptick in effective demand. A bottom had been reached in summer-fall 1932 in Britain and Germany, and in early 1933 in the United States. Here, indices of production, prices and employment increased rapidly from March to July 1934, but fell back and then off as recovery such as it was, was based on a buildup of inventories and not new capital investment. A sustained upturn was underway by winter 1935-1936, and by late 1936 and early 1937 the depression appeared to have come to an end in all the developed areas of the capitalist world, in the United States, England and Germany. By the first quarter of 1937, industrial production had achieved and surpassed the levels of 1929 everywhere except in France (where a marked expansion had nonetheless occurred in the same three-month period).

Yet industrial activity slowed in summer 1937, and in autumn it took a nose dive: In the United States, steel, at 85% of capacity in August had fallen to 38% in November. By December it was only a quarter of capacity (26%). Unemployment rose sharply. By winter 1938, the Slump had returned (Basil Rauch, *The History of the New Deal, 1933-1938*. New York, 1975 (1944); Charles Kindleberger, *The World in Depression, 1929-1939*. Berkeley, 1986).

⁴⁰⁶Incorporation into the circuits of capital as a product of that very movement did, and does, not entail infusion of an element of consciousness (insight into the structure of the totality), as moments, into those circuits. (And this, notwithstanding the "fact" that within the state discussion and deliberation began to mediate this incorporation). It is only as the state, already functioning as a national capital, engaged in formulation of industrial policy that the ruling class awareness in the form of planning began to exert influence on the movement of capital. We say "exert influence on" and not "shape" capital's movement. The whole process in which this incorporation developed presupposes as its basis competition among capitals that the state at the level of the polity is compelled to attempt to overcome. Capitalism remains "anarchistic," and that is its limit. That movement in its entirety is and will never be consciously directed: It can only be submitted to or transcended. Nationalism, revanchism, etc., are at best element of a false consciousness.

end... Thus, Truman ordered the atomic weapons destruction of two Japanese cities not to terrify a defeated Japanese people into submission, but as a demonstration and warning to the Soviets...

As the system of new relations was consolidated after the second imperialist world war on the basis of US victory, the locus of imperialist activity shifted (from capital export and appropriation of raw materials through direct colonial administration to capital export and raw materials appropriation through loans and currency exchange). It took shape as an imperialism of circulation, one resting on the creation of international financial institutions (IMF, World Bank), through which surpluses, after 1970 *more and more circulating internationally* (today along global supply chains), accrued to the leading power (the United States) on the basis of dollar transfers where the dollar backed by gold at a fixed price functioned as the world reserve currency, and, thus, through which the U.S. hegemon was able to dominate the lesser imperialist powers, as well as the smaller capitalist nations that can only aspire to such status... U.S. power did not, however, merely rest on a dollar suzerainty: The United States emerged from the last imperialist world war with the highest levels of *abstract* labor productivity anywhere in the world, productivity based on the world's most advanced labor processes, on the generalization of continuous flow production throughout American industry...

The aftermath of the last imperialist world war rivalry was renewed but based upon distinctively different, private and statist capitalisms and their respective blocs in tow. That rivalry compelled the US hegemon to rebuild the war-devastated economies of once great power competitors, Germany and Japan, as a condition of expanded US markets, and as the centerpiece of a geopolitical strategy (creating that bloc) of encirclement aimed ultimately at dismemberment of the state capitalist system of social relations. A nuclear confrontation was avoided by both sides, but this merely enhanced the likelihood and actuality of proxy wars as well as counterrevolutionary fights in the capitalist periphery where opposition to the old-style colonialism was greatest. Some of these wars were small-scale, others, like that in Vietnam, were not.

The costs of production of massive amounts of weaponry and armaments in this, the Indochina, war was exported abroad as the US ruling class faction housed in the state refused to raise taxes to shore up its support as fighting became increasingly unpopular. Dollars piled up, especially in Europe and Japan. The situation was extremely inflationary, and European states in particular sought to exchange accumulated dollars for gold. The run on US gold reserves led Richard Nixon in August 1971 to refuse to honor that exchange as the "gold window" was closed. Currencies floated, and pricing was simply an issue of relations of one to all others. In principle, this permitted central banks of the reconstructed economies of the private capitalist world, but above all the US Federal Reserve, to print money without restrictions. (Until 1980, balanced trade was achieved by payments in gold among trading partners at the end of each year. Thereafter, the fiat character of currency printing increasingly came to the fore) ...

But fiat currencies were not simply given or, more adequately, they were embedded in the productive relations between the significant classes in society and they rested on the achieved level of capitalist development, and the resulting prodigious productivity of abstract labor.

Those relation resulted in a shift in the site of industrial manufacturer. The shift has been, first, driven by institutionalized class struggle and led to relocation to the open shop south and southwest of the continental US (to avoid union restrictions on worker exploitation); then, second, driven abroad (by open class struggle⁴⁰⁷ which, unable to control, terrified the bosses) to East Asia, largely the Chinese mainland, where labor was qualitatively cheaper, unions did not exist and environmental restrictions did not either; and, third, by capitalist competition leading to technical innovation, effectively, automation. By no later than 1985 US industry exhibited signs of massive decline; by the moment of the financial collapse (September 2008) that industry, no longer the "workshop of the world," had in its large-scale, "Fordist" incarnation largely disappeared.

Thus, not all US industry relocated abroad; and at this historical moment, 3-4 million jobs and the industries in the US (with similar numbers relative to populations in industrialized Europe, S. Korea and

⁴⁰⁷We refer to the wildcats especially in the decisive sector, in autos; thus, there were wildcats in Detroit, at Dodge Main in 1968, at Chrysler Sterling in 1969 and Dodge's Eldon plant in 1969-1970, at the GM Vega in Lordstown, Ohio in 1972 that led to a three week strike initially far beyond union control, and then all over again in Detroit at Jefferson Assembly, Chrysler Forge and Mack stamping in summer 1973. Lest we forget other sectors, there was the nationwide by postal workers in the U.S. in 1970, and nearly boiling over for three years and the exploding in the 1978 coalminers' strike in West Virginia (Virginia, Kentucky and Ohio).

Even before China entered the field the shift in the site of production was a global phenomenon: German auto manufacturer is conducted as much in the German East and the Czech Republic as Bavaria; Japanese electronic components are produced in Malaysia and Thailand in as great a quantity as in Honshū.

Japan) that supported them are simply gone forever. A consequence of capitalist competition, this loss is "overdetermined," also a function of technical innovation, of novel scientific inputs to production, which have enormously increased abstract labor's productivity. Just two internationally operating firms, Caterpillar and Komatsu, manufacture and provide the vast majority of earth moving machinery for construction projects in the world today, while similarly Siemens and General Electric provide nearly all the turbines utilized across the globe in generating hydroelectric power from dams. All four firms have dismantled their big factories, all engage in far more extensive international operations, generate considerably greater volume and operate with vastly smaller workforces than in the recent past. Pick up any manufactured item in any retail outlet in the United States today and it will say "made in China," and will any similar item in, say, Venice (or Genoa or Rome), Italy, in Rio (or Sao Paulo or Recife), Brazil, in Sidney (or Melbourne or Perth), Australia, or in Port Elizabeth (or Cape Town or Durban), South Africa. This is characteristic of the entire situation of global capitalism. So that in these terms, the Chinese proletariat, perhaps just the part of it employed in Guangdong Province, alone is productive enough to satisfy the use value requirements of the entire world.

The absolute, vast decline in the number of industrial proletarians necessarily conjoined to the extraordinarily productivity of abstract labor has created a profound dilemma for capital... Capitalism unfolds and develops through a cyclical process of rapid growth and retrenchment, expansion and contraction, boom and bust. In the systemic sense, contraction, then, crisis, occurs *within the framework of overproduction, overcapacity and commodity surfeit, a product of the insufficient production of surplus value, the outcome of the technological innovation created by capitalist competition that renders too much labor-power superfluous, make it impossible for capitalists to valorize adequate amounts of abstract labor to sustain production at existing levels of development of productive forces. It is this fundamental contradiction riveting the global system of social relations. In prosaic terms, it is the fundamental situation that has rendered industrial investment so exceedingly unprofitable relative to speculative finance.*

And it is fundamentally that for this reason that today the mechanism of the extended reproduction of capital and its accumulation has a decidedly fictitious component. A world awash in easy money or credit (a world where printing presses never stop even if money is not being loaned), "liquidity," has become, at least in this phase of capitalist development, a necessary condition of the reproduction of the world system of social relations (i.e., to insure the continual functioning of insolvent banks and bankrupt governments), in others words, a necessary condition of the movement of capital.

It is the fundamental situation that produced the financial crisis (2008), and the stop gap efforts (great bank bailouts, quantitative easing, zero and negative interests), none of which has launched a new historical cycle of accumulation, to keep the system afloat. Today a shift toward protectionism at a national level and on a global scale, with the accompanying xenophobia and nationalism, is underway, replacing failed Keynesian panaceas. As the capitalist world (i.e., the world as a whole) totters on the cusp of a return to an open (general) crisis, *at the level of state policy this shift is a clear indication of the drift toward renewed imperialist world war.*

Imperialist appetites are motivated and directly driven by the requirements of the expanded reproduction of capitalism as a system of social relations, and further constrained by excess capacity and overproduction within that system, to pursue at whatever costs seizing surpluses as they circulate internationally. At the same time, these requirements (of expanded reproduction) take the form of a political struggle among states for markets and resources spurred on by a pace of resource consumption (and consequent ecological destruction) that is rapidly outstripping technical innovation requisite to the creation of a new order of raw materials from diminishing (largely hydrocarbon) resource bases, but by states whose actions are inextricably, indistinguishable and immediately determined by geopolitical and ideological objectives...

The current, or contemporary, configuration of imperialist power that the United States dominates, and China's red capitalists challenge, cannot be overturned short of another wrenching struggle involving, among other features, the employment of biological, chemical or nuclear weaponry, any or all, in imperialist world war.

Conditions for renewal world war have increasingly come together in the very dynamics of capitalist development on a world scale. They include the reemergence of competing imperialist powers on the basis of technologically advanced industrial bases, i.e., Germany and Japan, dating from the middle to late 1960s, and, consequently, the increasingly frantic and frenzied pace as which capital's technoscience shapes, reorganizes and restructures production, in which productivity has become so

gargantuan that it continuously threatens to explosively escape the value form in which it must be capitalistically expressed, paralyzing the system of social relations; the collapse of Soviet Union, unraveling the military alliances that suppressed competition and restricted dynamism and technical innovation largely to the armaments sector; the shift of industrial production to East Asia and the tendential formation of two poles of economic activity in world capitalist system of social relations, the dynamic industrial East Asia and the rentier economies of the old capitalist metropolises in North America and Europe, creating China as a capitalist and rival imperialist power (possessed of the largest industrial economy in the world) and reinvigorating once Soviet, now Russian imperialism with its large oil and natural gas resources on the basis of a growing significance of hydrocarbons in imperialist jockeying and rivalry; and, on this basis, the emergence of rival imperialist foci of world accumulation, consisting in a new center that lay along the East Asian industrial arc, situated on a line that runs from Shenzhen in the south to Shanghai in the north. It is this new center of capital accumulation at the level of the world that is at the vortex of interimperialist rivalry.

The potentiality for conflict, hence *the drift toward renewed imperialist world war is intensified, exacerbated and mediated by two conditions of capitalist development that did not obtain, nay did not exist, during the general crisis of capitalism, in particular during both of the two imperialist world wars*; the first of which is a level of simply astounding productivity of abstract labor that reduces turnover times and the period of a developmental cycle, that within each cycle voraciously consumes resources at a pace that is rapidly outstripping the rate of technical innovation required to shift the earthly resource base away from hydrocarbon fossil fuels and create a new order of raw materials on which the entirety of capitalist development can rest (for without accelerated innovation the prospects of a runaway planetary warming loom); and thus the second, the product of whole history of capitalism once established on its own basis (real domination), is the very facticity and then the extraordinarily rapidity (historically as well as geologically) of *global climate change*. Such renders access to resources more difficult, interrupts and makes production of agricultural foodstuffs and industrial raw materials less dependable, places more demands on the infrastructural foundations of capitalism which capital's movement at once produces and requires to reproduce (renewing, developing and recreating) itself on an expanded basis, and narrows the basis in earthly nature for human activity in its socio-historically specific, capitalist form. *All these problems are qualitative, and climate change, utterly novel and unprecedented*, is transforming all the rest, heightening inter-imperialist rivalries, tensions and struggle.⁴⁰⁸

Possible Consequences of Abruptly Changing Climate Planetary Technics and Renewed Death Worlds

Contemporary capitalist development is rife with contradictions, important among which are the growing expulsion of waged labor from production occurring simultaneously with the proletarianization of petty producers in the periphery and layers of the dependent middle stratum in the metropolis. More significant for this analysis is another contradiction that is unfolding with explosive forcefulness: The rapidity of

⁴⁰⁸In the context of this dual movement, a drift toward renewed interimperialist world war and accelerating, abrupt climate change, the lumpen middle stratum is at the center of an amorphous proletarianized mass, taking shape over the past two decades, with its own, decidedly backward appetites. While in the old capitalist metropolises (i.e., the US, Britain, France, the United Provinces, Belgium, Italy, not excepting high-tech sectors in Germany and Japan) industrial islands (specialized shops employing 50-300 workers) still exist, the old Fordist regime of production has disappeared. With it, the mass industrial working class stratum has been recomposed, downsized, and vanished. After four decades of subcontracting and outsourcing, offshoring, restructuring and rightsizing, while largely excluding the actually employed (multiple jobs) casualized, often youthful proletariat, a precarious mass of disguised proletarians (self-employed independent contractors), semi-proletarians (waged workers tenaciously holding to a small piece of e.g., rental, property in production) and lumpenproletarians together with retired workers surviving on a social wage (pension), lumpen middle strata layers (e.g., contractors living off occasional work, friends, family), all identifying themselves as "white," constitute a vast, casualized, shifting and amorphous mass without consciousness and fully habituated to capitalism. This mass is by and large ideologically integrated through its attachment to the "country" and the "nation," i.e., to the ruling class and its state, if not always to the long-established political parties of capital. It is an adjunct in one form or another tied to capital's coattails, hopelessly mystified, confused and without orientation in life, domestically it supports the increasingly totalitarian reconstruction of the bourgeois state; in global terms it forms a reactionary, chauvinist mass weighted in the scales of history as potential reaction against ruling class efforts elsewhere (Europe, China) to either renew capitalism beyond its hydrocarbon foundations, and an actual counterrevolutionary force arrayed against any genuinely proletarian effort (emanating from along the Asian industrial arc, or from that precarious, youthful proletariat, or both), no matter how spontaneous, to go beyond capital and its societal arrangements, in (both or) either event, this chauvinist mass weighs heavily in history's scales accelerates the drift toward renewed imperialist world war.

natural change brought on by capitalist development is running far ahead of the capacity (on capitalist terms grounded in technical innovation) to effectively respond to that change. To boot, this very development is not only creating but is accelerating an abruptly changing climate.

This contradiction last reaches back into the very structure of capitalist development. It is a function of the basic organization of societies subject to deepening real domination (overwhelming predominance of hydrocarbon-based capitals in the world economy, extreme and growing integration of capital and the state, habituation of hereditary proletarian populations to capitalism, hegemony of science in material and higher culture, etc): Capitals are increasingly and forcefully subject to the dynamics of the system of social relations - competitively driven technical innovation, simultaneous growth in fixed capital and ejection of labor from production, inability to valorize adequate amounts of abstract labor to sustain production at existing levels of productive force development, falling rates of profits across entire industries. Confronting global economic contraction, the always half-hearted, if not entirely ideological, effort to meet the warming-induced, climate crisis has been abandoned.

Faced with an impending climate change cataclysm, for capital sustaining bourgeois civilization requires, first, introduction of a qualitatively novel technology that, second, can displace and supersede the production of hydrocarbon fossil fuels as the foundation upon which capitalist development as real domination has rested. The demand is not for a shift on the order of communications based on landlines to those based on satellite transmissions (a massive shift but one within framework of existing communications), but on the order of change from mule and horse power (skipping steam) to petroleum as the basis of capitalist activity (a change that transformed the movement of capital itself, truly internationalized its movement, created in vertical and horizontal integration new forms of that movement, dramatically quickening the pace of the concentration of production and centralization of control over means of production, etc, all aspects of the same total movement in which imperialist activity first began to reorganize the capitalist world).

The premise of this transformation is abolition of the hydrocarbon, i.e., coal-oil-auto, economy and with the forms of sociation (especially the vast suburban metroseas, highway infrastructure, monocultural crop agricultures) that are essential aspects of it. For the ruling classes of the world to successfully embark on such a project, it would require capital to initiate a novel, non-linear qualitative technological "advance," i.e., a new technology, centered, not as it might immediately appear on a new order of the exploitation of nature but, on a novel relation to nature itself based on a shift from molecular energy from the atom's outer, electron orbit (by way of oxygen burning of decomposed, compressed organic chemical structures such as coal and petroleum) to energy derived from the atom's nucleus (energy release through proton fusion of two or more light subatomic particles, atomic nuclei, to form a heavier nucleus). While perhaps (perhaps not) visible on the horizon of existing science, such a leap, socially generalized, is beyond capital. (The renewables route that is currently being pursued largely just in one center of metropolitan capitalism, the European Union, is inadequate as break with the extant hydrocarbon base, and too dependent upon it to qualify as such a transformation.)

Capitalist states have cultivated surplus populations (cannon fodder) to fight their wars and, in housing them, flooded desert zones with metropolises. Unless one is willing to live like the Pima and Papago of old, Bedouins or Aborigines, in short order no one will be able to live in the Tuscans or Phoenixes of the world. Confronting global economic contraction, states, standing in for (representing) their largest, most economically significant capitals, have ramped up nationalist sentiment, have rallied popular support behind protectionist measures, and the persecution and, or, deportation of ethnic minorities and immigrants. Exemplified by the United States, these include tariffs, sanctions and more: Export subsidies, differential evaluations and exchange restrictions, currency devaluations, block accounts, capital controls and quota systems have all followed. Recapitulating the development of the 1930s in novel ways - the classic formula is trade wars lead to shooting wars which, in turn, lead to world war - the ruling classes of this world are not preparing to deal with "natural" change but with the maelstrom of social change, with class conflict and major domestic confrontations with efforts to divert them into war abroad: What characteristically exhibits the tendential direction of contemporary capitalist development is the creation, enlargement and refinement of technologies of social control, and their integration with that aim (social control) while expanding production of fossil fuels. The very fact that biogenetic, informational and materials technologies form the most dynamic societal productive complex within contemporary capitalism elegantly speaks to the issue at hand: The elaboration of the means and wherewithal of a novel type of totalitarian control signifies capital's retrenchment. If the operative ruling class assumption is that it is necessary to pour societal resources into preparation for that storm of social change

(generated by natural change), this societal wealth is not aimed at meeting and curtailing the most dangerous effects of climate change: Ruling classes ain't devoting their pennies to technical innovation aimed at ameliorating climate change; instead, military budgets are booming. Again, the US is the case in point. The ice packs on the Rockies are going to melt, the Colorado at its source will dry up, and the denizens of desert cities will pack up and leave, or die. Long before this happens, the pressure on an idiotically centralized grid will lead to breakdowns, brown-outs, then black-outs, and finally collapse of the grid in the areas of highest demand. If one really believes that capitalist technologies can innovatively keep pace with accelerating, abrupt climate change,⁴⁰⁹ think again: The situation we are living through today is a product of the levels of atmospheric greenhouse gas concentrations that were emitted thirty 30 years ago. The emissions between 1991 and 2020? Yet to be seen, felt and lived through, these effects are already irreversible.

Whither, then, capitalist development in its entropic drive to infinitely remake nature?

It entails global-warming induced loss of freshwater supplies and more severe droughts conjoined to, over time, qualitative increase in the frequency and the intensity of flooding, fires, heat waves, hurricanes, crop failures and food shortages; the irremediable, degrading transformation of ecosystems and the natural services they render humans; species destruction undercutting biological diversity as the foundations of life, human life specifically. Then, there are the more dramatic consequences of the ongoing, climate change transition: Rising sea levels resulting from melting ice sheets and glaciers will swamp coastal areas, destroy built environment from villages to great metropolises, inundate and irreparably pollute fresh water bodies and drown croplands. The first responses will be a human exodus of hundreds of millions of refugees, since roughly 3 billion people ... nearly half the world's population... live within low lying coastal regions. But as rising seawaters threaten infrastructure (roads and highways and public transportation, sanitation facilities, drinking water reservoirs and aquifers, and power plants) in urban coastal areas, states will directly and forcibly intervene under the aegis of protecting national economies and social stability. One can expect forced marches into the interiors where masses of men and women will be compelled to live out the balance of their lives in concentration camp type settings under conditions of increasing social decay (conditions approaching a real Hobbesian *bellum omnium in omnes*) and without, it goes without saying, adequate infrastructure (from power to sewage treatment). In all this, as we have pointed out, the state deepens its stranglehold over "its" underlying populations, facilitating the practical elaboration of a bio-politics of population, the (affective, even genetic) manipulation of masses of men and women and their transformation in objects of a state policy as raw materials of that policy.

And, in all this, the ruling classes of the world will later than sooner recognize the mortal threat to their societies and civilization posed by a climate change catastrophe. Among those vanguard elements who assess the disappearance of the current institutional configuration of bourgeois civilization as an inestimable loss, measures from the dramatic to the drastic are already being mooted.⁴¹⁰ At this point, only the most concentrated force among states, the institutional military, and only the most technologically advanced in capitalist terms (because this institution remains the focal point of consumption of societal wealth, its cannibalization) will be capable of intervention. The desperation of the classes attached to capital at their hips will be tangible, exhibited in what would be a timely American solution, a vast technological "input" to "solve" the problem of runaway warming, such as a sunlight deflecting disk positioned in space at Lagrange points designed to redirect incoming solar radiation.⁴¹¹ "Solutions" on this order do not merely increase, but multiply the power of the state over life: It will be at

⁴⁰⁹Starting from a much warmer Paleocene (palm trees grew in Greenland), a massive release of methane hydrates (clathrates) on the ocean floors warmed the oceans (the Southern Ocean about 11°C, 20°F) changing their chemistry from top to bottom (they turned acidic) and killing 40% of all marine life (Elizabeth Nadin, "Global Fever"). Atmospheric carbon dioxide doubled and average global temperatures rose 5°C (9°F) in just 13 years ("New Finding Shows Climate Change Can Happen in a Geological Instant," 7 Oct 2013, <http://phys.org/news/2013-10-climate-geological-instant.html>).

⁴¹⁰For example, the production of marine stratus clouds across large ocean surface expanses (clouds or mist just above sea surface), utilizing small devices that change sea water into aerosol to nucleate these clouds; the manufacture of equipment to remove carbon dioxide from atmosphere, by creating a chemical reaction of it with a powder made from alkaline igneous rock; and still other measures.

None of these measures do anything to address the continuing production of carbon dioxide itself, not to mention that their utilization will increase ocean acidity which itself will destroy marine life. They would be one and all reactive measures aimed at fancifully reversing that which by then would be ineluctable.

⁴¹¹Lagrange points, there are several, are places in space, miles wide, between the Earth and the sun (far, far closer to us) at which gravitational pulls cancel because they are equal and opposite

this moment that planetary technics - the *seemingly* unsurpassable domination of capital's technology with its ideational premises, reflexes and extrusions, techno-science, bourgeois egoism, productivist metaphysics, and dreams of commodity abundance ... the term is Heidegger's, the usage ours – comes together with a renewed institution of death worlds...

As it intensifies and before abrupt, qualitative change introduces a new hot mode, climate change will enter into and decisively shape rivalries, qualitatively exacerbating tensions, between imperialist powers. Mediated by states operating as national capitals and the interimperialist rivalries this entails, the law of value⁴¹² operates both direct and indirectly in the drift toward a renewal of imperialist world war, immediately and directly in the struggle for globally circulating surpluses and indirectly and mediately in a vicious political struggle for markets and resources. Climate change, then, will and has already begun to greatly exacerbate and heighten this, the latter struggle, and, in so doing, legitimizes and socially justifies intensified exploitation, repression and regimentation that is already given with same bio-politics of populations.

Inseparably intertwined with to climate change, this double movement is a basis for a reconfiguration of and creation within the decaying societies of the world of an entire array of truly ghastly death world variants (which in some cases may be a societal devolution), something on order of the Holocaust, the industrialized world of mass death in Auschwitz and the other well know death camps (Birkenau, Majdanek, Chelmno, Sobibór, Belzec, Treblinka) as well as those slave labor camps where brutalized inmates were worked and starved to death not to mention the countless round-ups and compulsory marches ending in mass murder. Within the framework of bourgeois civilization, this, in its all appalling, horrifying and utterly criminal aspects, is the terminus of the order of capital.

⁴¹²We intend here the broadest sense of this usage, namely, the tendential reduction of social relations to productive ones, that is, the disciplining and regimentation of former by the latter implied in the regulation of production of commodities and expanded reproduction of the total social capital by socially necessary labor time.

Endings

Some Conclusions

Converging Crises of Nature and Society in Nature

Deep Past Reconstruction Yields a Perspective on the Temporal Totality, Past, Present and Future

A Scene from the Insect Armageddon



NATURE'S MODERNIST GROTESQUERY

***Paper Wasp Nest (48.6 cm x 34 cm)
Thomas Lake Park (wooded walkway entrance)
8 August 2018 (0630 hrs)
Sprayed with Insecticide (poisoned) and removed,
destroyed by Eagan
Parks and Recreation (Eagan, MN, USA), 3-7
September 2018***

Capitalism and the Domination of Nature ***Earthly Premises of All Living Existence, Capitalist Technologies, the Modern Science of Nature and the Movement of Capital***

With its relations of production, of exchange and of property, modern bourgeois society, a society that has summoned up such colossal means of production and of exchange, is like the sorcerer who is no longer able to control the powers of the underworld whom he has conjured up by his spells.

Marx and Engels, *The Communist Manifesto*⁴¹³ (1848)

If technological man had conscience of his dependent position in the whole of nature, he would be better equipped to do a good job for himself because in the long run, a cosmological phenomenon might put an end to the adventure of man. This phenomenon is probably in the making, and it is quite possible that man is one of the agents of this making. Disregard for nature is, in any case, the worst premise for survival, let alone development.

Paolo Soleri, *The Bridge Between Matter and Spirit is Matter Becoming Spirit* (1968)

The earth is the very quintessence of the human condition, and earthly nature ... may be unique in the universe in providing human beings with a habitat in which they can move and breathe without effort and without artifice.

Hannah Arendt, *The Human Condition* (1959)

.... The proposition of innumerable habitable worlds is not falsifiable... however, [it does assume that] an identical sequence of physical and biological events ... [has] occurred elsewhere. ... [Yet] only one example of high intelligence, *Homo sapiens*, has arisen in perhaps 50 billion attempts on ... Earth [itself]...

But even on this most suitable of planets, there was nothing pre-ordained about the emergence of *Homo sapiens* on the plains of Africa.

When the remote chances of developing a habitable planet are added to the chances of both high intelligence and a technically advanced civilization, the odds of finding ... [a comparably intelligence species] ... in the universe decline to zero.

Stuart Ross Taylor, *Solar System Evolution* (1994)

I can imagine a thousand years from now a small fragment of humankind barely surviving the new planetary climate huddled round a fire in some remote northern latitude observing the night sky, subsisting perhaps as hunter-gatherers on a vastly different and biologically depleted planet listening to a tale vaguely recalled in ancestral memory by the local shaman.⁴¹⁴

Capital is an endlessly entropic, anti-natural and anti-human force, a cannibal and oupyr, a prosaically real abstraction, evil incarnate, a demon, borne by zombies (a large, dissolute and diseased layer of metropolitan populations at the center of the system of social relations), singularly aiming at remaking the Earth as a whole as a raw materials basin by way of production and a lifeless wasteland in and through endless cycles of consumption.⁴¹⁵

Introduction

Past communities, societies and civilizations have been assimilated, cannibalized and often obliterated by the epochal creating movement of capital. Over historical time, this has proceeded to that point where at best there are mere remnants of these forms of sociation without meaning, function and reality apart from that which they play for capital. The civilization of capital now constitutes civilization as such.

At this moment, today, an unfolding climate change catastrophe is encompassed by the movement of capital. As that catastrophe deepens, its expanse grows, frenzied, convulsive and unimaginably overwhelming capital's movement, the weather and those once extraordinary natural events (through which climate manifests itself and which constitute its outward forms) will unfold more and more

⁴¹³"Die bürgerlichen Produktions- und Verhältnisse, die bürgerlichen Eigentumsverhältnisse, die moderne bürgerliche Gesellschaft, die so gewaltige Produktions- und Verkehrsmittel hervorgezaubert hat, gleicht dem Hexenmeister, der die unterirdischen Gewalten nicht mehr zu beherrschen vermag, die er heraufbeschwor" (our translation). *Manifest der Kommunistischen Partei. Marx-Engels Werke, Bd. 4.* Berlin (DDR), 1977: 467

⁴¹⁴Marty Hoffert speaking with Andrew Revkin, "Scientists React to a Nobelists's Climate Thoughts," *New York Times*, 17 September 2010.

⁴¹⁵*Haemophagous Lords Stalk the Earth, Ab-dead Underlings Murder its Creatures and Zombie Hordes Wreck its Landscapes.* N.p., n.d.

autonomously, more and more menacingly, existentially threatening the material culture and civilization of capital, and beyond this, not just human life but life across the planet. This much is now coming to pass.

Capitalist Criminality

Destruction of the Foundations of Humanity and Life in Earthy Nature The Road Back to the Rift Valley and Far Beyond (the Eocene)

What is important to recognize is that the criminality of capital goes beyond the vast and potentially catastrophic problems that climate change has introduced. Even if societies of capital were to come to grips with ongoing climate change in a manner that would allow them to maintain densely populated reserve industrial armies of labor, now a global surplus population (preventing it from being transformed into massive migrant and immigrant groupings housed in enormous borderlands camps); the industrial and financial built environment of megalopolitan landscapes and the polities raised on them (preventing these from engaging in large-scale slave labor practices); the vast and gigantic fossil fuels infrastructure (underwater plumbing linking thousands of oil wells in the Gulfs of Guinea and Mexico to name just two regions, thousands kilometer long pipelines, fleets of oceangoing tankers, coal-fired power plants), not to mention the enormous mass of circulating commodities... retention of these features is a highly dubious proposition... planetary ecological collapse that starts from the destruction of biological diversity as the foundations of life on Earth will not cease. This collapse originates in and is developed and sustained by the movement of capital, its causation begins with the *practical* reduction of surrounding nature to raw materials for capitalist production, and its cessation can only start from the abandonment of the activity through which this reduction occurs.

Climate change is ongoing, occurring within the framework of global ecological transformations that too are ongoing, and that are being accelerated by it. If we consider several dominant forms of transformation, it becomes patent that this framework itself, as it has originated, is fully determined by capitalist development: In our language, we seek to assess capital's criminality and to indict it. These are not positive, factual and legal concepts; nor are they moral. Rather, what we aim at is the immanent basis of capitalist production, the fundamental grounds on which it and all earthly existence rests, with respect to the transcendent meaning of the logic and movement of capital, a movement whose significance is revealed in its culmination in its own destruction and that of those foundations...

The consumption of hydrocarbon-based fossil fuels, oil, natural gas and coal, is producing a warming of the Earth that is melting the ice caps and raising sea levels, thus threatening the vast seaboard populations of the world, producing a shift in the regime of climate as it has existed for the past two million years on Earth, leading to geologically rare, if not unprecedented, mass species extinction.

Vast tracts of forests (for example, the hardwoods of the tropical rainforests) are clear cut, the "residues" burned, in order to satisfy the aesthetic *and* profligate needs for consumption by the well-to-do middling groups of the old capitalist metropolises and those emerging in the new centers of accumulation and consumption on a world-scale. Equally vast tracts of forests are destroyed, burned, for land to grow monocultural agricultures. Created to capture food markets globally, destruction of forests upsets, literally uproots, intricate ecological balances among plant life, microorganisms, soils, and humans and their cultures dependent upon those forests for their form of life. Gone are their luxuriant foliage and undergrowth. In their stead nutrient poor soils and top soils incapable of holding water appear. Aridity results, eventually desertification. Entire microorganic, plant, insect, bird and mammalian species dependent on forests and their canopies for their habitat and food go extinct. And that, in turn, deprives humanity of incalculable medicinal wealth.⁴¹⁶

In the end, regardless of who these forests for farming (as well as for grazing, timber and fuel), they are managed by agribusiness capitals: Massed farmlands produce exotic fruits and vegetable for markets in the capitalist metropolises; plantation estates raise tobacco and sugar, also indigo, dyestuffs and cotton; monocultural grain agriculture largely produce corn, wheat, rice and soybeans; and tree forestries grow pine, eucalyptus and palm. One and all are *entropic and utterly unsustainable*: They destroy bacteria, plant life, animals and birds dependent upon that plant life, soil productivity and human farming practices. Without regard to accumulation and profitability, outside that immediate metropolitan capitalist countryside those practices have been integral to this humanized nature, that is, to the existing plethora of humanly natural ecosystems created by hundreds of generations of previous agriculturalists,

⁴¹⁶For further elaboration, see *On Productivism*. St. Paul, 2008: "Constitution of the Full Sensuous-Material Premises of a Productivist World (i.e., a Highly Rationalized Capitalism)."

peasants, petty producers and forest dwellers. Those human farming practices have sustained rural, village-based forms of life for nearly ten thousand years. But capitalist agriculture? Again, utterly unsustainable: Monocultures are generally water intensive drawing off water resources from elsewhere since they, absent diversity (much less creating it), lack the capacity to hold water through top soils that merely wash away in heavy seasonal rains; lacking variegated plant life, microorganisms that attack pests disappear, and pests become a problem. The pests are met with insecticides, pesticides and herbicides, which, in turn, poison aquifers, streams, rivers and oceans, which, in turn, creates the necessity of biotechnological genetic splicing that, in its turn, introduces transgenes transmitted through natural interspecies crosses which, in their turn, have allowed emergence of resistance superweeds and superpests, which, in their turn, demand the application of further chemical poisons, i.e., insecticides, pesticides and herbicides, and further poison groundwater and waterways.⁴¹⁷

As sea levels rise, invariably these monocultural sites, situated in low lying areas, will be among the first to be inundated, rendered useless, and abandoned by capitalist practice. But before this ever happens, monocultural agriculture and forestry destroy the basis of life for agricultural populations who are not engaged in waged labor and not fully dependent on capitalist market. The sacrifice of this basis of life is justified with reference to efforts undertaken by great agribusiness capitals and plantation agricultural capitals to achieve progress in feeding humanity. So capitalist ideologues argue. In fact, what they achieve is a generalized lowering of nutritional intake, qualitative increase in chemically poisonous substances (synthetic carcinogens, pesticide and herbicide residues)⁴¹⁸ as a feature of that intake.

Simultaneously food production at the level of the world has been restructured. Consequences? On average caloric consumption for the masses of humanity has been drastically lowered; never a biological question of "excessive" population pressure on the immediately available resources in nature, socially mediated by capitalist commodity markets prospects for regularly recurring crop failure and famine have dramatically increased; and concentration of capitalist wealth with a corresponding casualizing proletarianization of hundreds of millions of petty producers has vastly accelerated. In point of fact, non-capitalist, small-scale biodiverse grounded agricultures are more productive.⁴¹⁹

Monocultural crop agriculture and forestry are moments of the *homogenization* of nature and society generated by the movement of capital: In destroying genetic diversity, monocultural activity has no basis, it is a decisive aspect of the cannibalism that is capital, is not sustainable, implies death, i.e., if pursued will contribute immensely to the recreation of the Earth characterized by Canfield oceans, prevalence of anaerobic bacteria and vastly increased hydrogen sulfide atmospheric content or, alternately, simply as a dead planet.

Must we point out that *aerobic life much less a general emancipation is not possible on a planet without an oxygen-nitrogen atmosphere or, worse, one that is dead?*

The vast system of ocean transportation of petroleum from oil wells to locales around the world produces industrial accidents, massive oil spills fouling seawater ecology, destroying marine life and contaminating coastal land. The discarded, broken, pulverized plastic wrappers and containers of all sorts are the refuse of a civilization which must pursue production for production's sake. A civilization, a mode of production and a form of life that produces trinkets, baubles and assorted junk to cope with excess capacity. Vast amounts of this refuse end up as garbage intended for export to landfills criminally dumped by ships at sea (it's a question of lowering the costs of transportation); it ends up washed out to

⁴¹⁷And, of course, insecticides, pesticides and herbicides are not the sole agricultural applications. This leaves aside the whole issue of fertilizers.

As far back as 1998, the total world use of nitrogen fertilizer (largely in cropland) was only 20%-30% less than total terrestrial biological nitrogen fixation. L.T. Evans, *Feeding the Ten Billion: Plant and Population Growth*. Cambridge, 1998: 120, and sources therein. (The situation has, of course, markedly deteriorated since then.) Nitrogen runoff creates anoxic waters, for example, the Mississippi as it drains the lands of the North American center and south flows into the Gulf of Mexico, where the nitrogen induces algae blooms which give rise to anoxic waters. The Gulf dead zone today (2014) encompasses about 14,000 square miles.

⁴¹⁸James Lovelock noted as far back as 1978 that, empirically demonstrated, there was no longer a living being on Earth whose tissues do not bear pesticides. *Gaia: A New Look at Life*. London, 1979: vii.

⁴¹⁹Different systems of agriculture (capitalist monoculture and traditional rotational, mixed multi-crop agriculture, e.g., in India) do not generate shared terms allowing overall comparison of systems of agriculture: Determination of the vaunted productivity of crop monocultures (e.g., wheat and rice) is largely a conceptual abstraction, an ideologically shaped category that rests on a de-contextualization, one based on a limitation of what counts as productive to a single aspect of agricultural practices. I.e., the comparison, when favoring crop monoculture, does so only when constructed on the basis of profitability; and when the outputs of hybrid seeds are set alongside high-performance indigenous cultivators, the latter more often than not fare better than the former.

sea from land during storms; it ends up accidentally lost overboard from container ships. All petroleum-based products, it ends in four or five ocean gyres. The largest amount ends up swirling around a 10-million square-mile oval (twice the size of Texas) known as the North Pacific gyre, a million pieces per square mile floating on the ocean surface (and on the ocean floor a mass by weight six times as great as plankton), that is entering the food chain, killing more than a million seabirds, 100,000 marine mammals, and countless fish in the North Pacific each year, either from mistakenly eating this junk or from being ensnared in it and drowning. Among those further countless fish that survive this encounter, that are caught by industrialized trawlers and that are served in restaurants and homes, the residue toxins product of the manufacture of these plastics, so consumed, are making their way into *our* blood, urine, saliva, seminal fluid, breast milk and amniotic fluid contributing to obesity, causing infertility and disrupting hormonal activity.

Product of two and a half centuries of capitalist industry and specifically decades of the oil-coal-auto economy, the increasingly density of low level atmospheric pollutants have enhanced the virulent character of the most ubiquitous of human disorders, the common cold, its occurrence today generally developing with bronchitis or bronchial asthma.⁴²⁰ This, in turn, creates an entire series of respiratory disorders as a new feature characterizing daily life, but an affliction which immunologically compromises humans, especially the mass of humanity that does not have proper access to medical care. These injurious health effects have been multiplied by the accelerating movement of capitalist commerce which has visited distant populations with potential pandemics of different strains of avian influenza, MERS, Ebola and still other epidemic diseases.

Aimed at greatly enlarging worldwide markets for meat consumption (chicken, beef, pork), i.e., aimed at capital accumulation, the scientific management of poultry and livestock based on principles of industrial production is deployed in massing literally thousands or millions of animals or birds in tightly enclosed quarters (birds on the Tyson model). Naturally occurring disease runs, uninhibited, through these populations at frighteningly rapid speeds creating virally mutating highly pathogenic, potentially pandemic viruses (having in birds already produced wild waterfowl as a natural reservoir for A/H5N1). At the same time, industrialized methods of slaughter, in particular the organized massed animal murder on high speed, highly rationalized assembly line operations, guarantee the unsanitary nature of the "product" through transmission of blood and feces in gutting, butchering and carving. It thereby gives rise to life threatening strains of antibiotic resistant bacteria (E. coli, Campylobacter, salmonella, listeria, etc). Endemic to highly stratified societies where animal domestication proceeds on the basis of extremes of poverty and wealth, viral (and bacterial) disease has emerged *anew*, i.e., in qualitatively more resistant, medically baffling and epidemic and pandemic forms, at the end of the chronological twentieth century.

Statistically insignificant, few cancers are hereditary. For the rest, at their origins they are products of capitalist induced ecological imbalances in humanized nature (including man as humanly natural), irregularities and aberrations introduced into animal and human organisms. Introduction occurs, first and foremost (here we have in mind leukemia, and bone, breast, cervix, ovary, prostate and stomach cancers) through internalization (ingestion or inhalation) of man-made fission products, radiative particles (strontium 90, cesium 137 and 134, iodine 131 and 132, plutonium 239 and 240), from atmospheric fallout of past nuclear weapons tests and the more prosaic leakage from commercial, military and research reactors (not to mention the occasional meltdown). It occurs, most commonly, through long periods of contact with contaminated water and polluted air, through life long ingestion of organically inassimilable fatty, pesticide covered or chemical-preservative ridden foods, and extreme exposures to sunlight which today with thinner ozone layers in the higher latitudes have markedly increased the incident of melanoma. The same can be said about coronary heart disease: Its dramatic upswing is directly and immediately a product of obesity in conjunction with sedentary living, both outcomes of capitalist development, the former traceable back largely to the consumption of processed "cuisine," "food" created by contemporary capitalist production.

Disease in the specific forms that devolve from capitalist development is compromising, in large strata undermining, humanity's own evolutionarily made health, its culturally formed biological foundations.

The movement of capital is leading to a massive and criminal termination of plant and animal species and microbiotic life forms, effectively synonymous with the destruction of biological diversity, an

⁴²⁰And here we have not even included effects of four decades of the atmospheric spraying of aluminum oxides, barium salts and strontium deploying in atmospheric spraying by capitalist militaries to reflect sunlight as experiments in weather transformation for purposes of its control in combat situations; nor have we included deleterious health effects from similar spraying by gigantic agribusiness capitals to bring on crop failures in order to promote their metallic nanoparticle resistant seed products.

extraordinary contraction in *the very basis of life itself*. More precisely, the pursuit of exploitable "natural resources" for capitalist production on a world-scale has created a geological and biological regression reversing tens of millions of years of geophysiological evolution.

In the history of the evolution of earthly nature, species, new ones, comes into being and they disappear: Human beings, abrupt climatic changes, and even the occasional (by geological standards) natural calamity originating from beyond the Earth in the solar system bring about extinctions, even the rare mass extinction. Yet this statement of geological reconstruction misses the point: If, as consequence of its inability to gain access to food sources as global warming melts the ice fields it uses to traverse distances, or as a result of the early death its young as industrially emitted PCBs fall to Earth in their greatest concentration in the Arctic and lodge in milk of lactating mothers bears, : the Arctic polar bear dies out, it is an unnecessary loss of a majestic creature, one that is final. *Extinct species do not make evolutionary reappearances*. Nonetheless this loss, unintended and undesired, is *not of the same order or magnitude as that at which bourgeois civilization unknowingly takes aim*. That aim transcends the life and times of any individual, social group, or plant and animal species individuals. *The logic and movement of capital objectively and necessarily undermine existence and being as such in the ways that they are given and appear in and on earthly nature: The problem is that specifically capitalist social transformations are borne along by an objective logic whose outcome is necessarily the very destruction of the natural world in its autonomy, cohesion, diversity and otherness, that is, in its abiotic coherence, as living, and as a presupposition of specifically human life: It is the natural world as the totality of earthly nature which capitalist social transformation takes as its object.*

The grand sweep of capital's movement at the beginning of the twentieth-first century can only portend a future in which nature, because *for capital nature is raw material for commodity production*, at the very least undergoes continuous and ever greater *homogenization*. *As a product of the movement of capital, such homogenization is homologous with the formally identical homogenizations of agriculture (disappearance of vast variety of species of seed and plants). It is homologous with homogenizations of domesticated animals, languages and cultures in the order of society. The homogenization of nature overlaps and dovetails with rapid climate change. It may very well be finally consummated in a runaway warming that recreates Earth as a dead planet like Venus. Homogenization of the Earth has for some time now tended toward the creation of nature existing at two poles, uglified raw material basins at the start of a cycle of commodity production and noxious wastelands and garbage cesspools at the end of that cycle, i.e., with commodity consumption.*⁴²¹

...Now this may not appear immediately obvious, but it is not cognitively difficult to grasp and it is undeniably present to us in daily experience. We see it all around us. That is, we find surrounding nature reduced to a raw material basin... which presupposes that from the standpoint of capitalist activity nature is immediately apprehended as "matter"... all around us, in denuded forests, open surface mines, desertified grasslands, mountains stripped of trees with their peaks literally lopped off or their descending sides carved out, waterways suffused with oil manifest in their discoloration, sea bottoms pocked with countless wells plumbed together and in myriad other ways. We find the inevitable result of this in wetlands turned into landfills, decaying urban centers and the toxic ground of abandoned industrial sites, crumbling infrastructure, and vast stretches of roadways with trash and junk scattered to each side, endless expanses of ocean densely littered with plastic refuse while rivers, lakes and streams are filled with the debris (plastic bags and bottles, food containers, glass bottles, metal soda and alcohol cans) of capitalist civilization...

What in a general way is the outcome of homogenization? It is the destruction of diversity within earthly nature: This diversity includes, among other things and relations, a variety of different climatic regimes and zones, a multitude of regional landscapes, and, centrally, a huge assortment of different life forms. Thus, it is precisely this internal diversity which humanity has co-produced and of which humanity is part that the movement of capital, together with abrupt climate change (itself initially product of the movement of capital), is *irreversibly* destroying. *It is a humanly formed nature without which humanity cannot exist. Capital is perpetrating a crime for which there is no name, an enormous crime that* (with the exception of the few details sketched in literature and films of anti-utopian science fiction) *largely remains*

⁴²¹In the most "advanced" sites of capitalist development, human beings, acting and interacting on this nature we are remaking in its totality, have already begun to morphological, anatomically and physiologically exhibit characteristics of a degenerating species – witness the "epidemic" of obesity, the alarming growth of asthma among dwellers of large metropolitan centers, and the skyrocketing instances of cancers of all sorts themselves products of the leeching, seeping and emissions of countless radiative substances and toxins into the air we breathe, the water we drink and the food we eat

unimagined: It is the totality of earthly nature (earthly nature as a totality and in its totality) that the movement of capital is unraveling... For complex life of which "man" is part, this is the road back, far beyond the Rift Valley, to the Eocene... This collapse in earthly nature is temporary, but measured geologically on a millennial timescale "temporary" has no meaning for the living generations of humanity and countless more to come.

Part I

Capital and the Crisis in Nature (Continued)

The Geophysiology of the Earth, III

Capitalist Development, Species Extinction and Climate Change

At this moment, the primary cause of species extinction is habitat destruction, the ruin of complex, intricate, interdependent and often intensively humanly shaped ecosystems. It is a consequence of capitalist development determined from the penetration in depth of the value form into surrounding nature. The same socially necessary labor time required for the reproduction of capital that tendentially shapes and regiments social life by deciding capital flows or arenas for the most profitable exploitation of resources and utilization of money capital is also responsible for species extinction. Capitalist development destroys habitat, removing the foundations of species life, first, in the forms of industrial development (plant construction); second, in real estate development issuing in suburban sprawl (home and office construction, and venues of consumption such as strip malls); then, especially in industrial logging, the clearing of forests for monocultural crop agriculture, and mining; in road and highway construction (as in the infrastructural presupposition of all of these forms of development); in heavily mechanized ocean trawling of fisheries (here gillnetting and longlining have led to the near extinction, soon to be fact, of numerous, once extraordinarily large fish populations, species of salmon, tuna, cod, halibut, swordfish, marlin, shark and skates); and, beyond habitat destruction and no longer on a small scale, in trophy hunting and poaching carried out systematically by highly organized, capitalist and criminal syndicates, gangs and mafias *and* by proletarianized men driven to this activity by the loss of forests and farming land to which they previously owed their life and activity. Before mid-century, all well-known large mammals, animals that require expansive terrains they traverse to hunt and feed, lions, all species of tigers, elephants, hippopotamuses and rhinoceroses, and great apes, orangutans and several chimpanzee species as well will be extinct *as species* (whether or not a few *species-individuals* survive). Now whether all this is obvious may be open to question, but that it is ongoing, that is it internally and necessary a product of capitalist development even if only superfluously understood in terms of economic growth, these features are commonly understood: There is nothing esoteric or arcane in this. Species extinction has another causal dimension, rapidly becoming its central one, that goes beyond the mundane features of capitalist development: The same movement of capital described in the above forms of production and development is inducing a climate change warming that is vastly accelerating and extending species extinction, making it what is characterized as a *mass* one.⁴²² In the very near future, climate change irreversibly threatens the vast bulk of aquatic life on Earth.⁴²³ As carbon dioxide emissions continue to increase (even if they were to level off at current rates), as CO₂ rises into the atmosphere carbon-based pollutants are rained out and enter seawaters; and as the concentration of free hydrogen ions (product of chemical reactions of those pollutants with an aqueous environment) in those seawaters increases, slightly alkaline oceans become, and are becoming, increasingly acidified. Acidification of oceans eventually destroys aquatic species. In fact, growing

⁴²²Generally, between 1970 and 2016 60% of mammals, birds, fish and reptiles on Earth have gone extinct. *The Guardian* cites a 2018 World Wildlife Report. Online at <https://www.theguardian.com/environment/2018/oct/30/humanity-wiped-out-animals-since-1970-major-report-finds>. Then there are insects, pollinators of a good part of global agriculture, recyclers of materials in the science and purifiers of water, food for birds, bats, fish and other vertebrate species. They are disappearing as a consequence of death due to long-lived pesticides, still other agricultural chemicals, urban insecticide sprays (in parks, along walkways), the rise of pathogens as tropical climes push north. Studying Central Europe, the Krefeld Entomological Society found that since 1989 roughly 75% of the insects at sites they monitor. Gretchen Vogel, "Where Have All the Insects Gone?" *Science*, May 10th 2017. Similar reports have since poured in from four other continents in the world

⁴²³Ninety percent (90%) of all large ocean fish have gone extinct since 1950. See <http://www.cultureunplugged.com/doc/umentary/watch-online/play/7350/Call-of-Life-Facing-the-Mass-Extinction>. In more recent years, the shells of key species requiring calcium carbonate, such as corals, crustaceans, mollusks, sea butterflies and some plankton species, have been dissolving due to increased acidification in the oceans caused by society's CO₂ emissions. Bednarek N, et al (2014), "Limacina helicina shell dissolution as an indicator of declining habitat suitability due to ocean acidification in the California Current Ecosystem. *Proc. R. Soc. B* 20140123.

oceanic acidification has already killed two-thirds of coral reefs in the oceans of the Earth, and is killing zooplankton. There is great danger here, of an upward cascade of extinctions as life forms at the bottom of the oceans' food web are destroyed, and extinction follows upon extinction as a basic life form, a critical food source for a host of other life forms and still more life forms tiered atop these, disappears... These extinctions (which on the present course are inevitable), together with climate warming, will destroy nearly all ocean fish, and mammalian species (seals, walrus, whales; polar bears, arctic moose, "reindeer; as well as most species of turtles and penguins) that depend on ice, the Arctic or these microorganisms for their existence and beings.⁴²⁴

Brought on and propelled by capitalist development, the current rate of species extinction is about one hundred times the natural rate, an average calculated over geological time. What this portends is an extinction not just massive, but one that is not occurring in deep geological time but in historical time, and because the temporal horizon is so extraordinarily compressed, plant and animal species that might otherwise survive over geological time will not in historical time. (The most mobile species, and they are few, are capable of migrating away from regions most effected by climate change at rate of about 20 kilometers a year).

So, in reconstructing the geological past, what we have come to recognize is that we are confronting a *mass* species extinction on the order of those that have occurred on five previous occasions in the past 540 million years, each of which has occurred from over several thousands to roughly 5-6 million years, and each of which has destroyed between 50% and 90% of life on Earth. Each of these extinctions transpired in the geological context of, and were generated by, massive climate change which in each case was precipitated centrally by an enormous rise in atmosphere carbon dioxide relative to existing levels. Today, *product of the movement of capital*, an ecological catastrophe *is ongoing*, not in geological but in vastly compressed historical time; these alterations are so telescoped that are they even manifest in individual lifetimes. Should mounting atmospheric CO₂ levels go unchecked, this extinction will occur as the sixth known or geologically reconstructed *mass species extinction* in the nearly four-billion-year old geological history of life on Earth. It constitutes, moreover, a biological regression that is reversing tens of millions of years of natural evolution... roughly 55 million... and undermining the basis of life, including human life itself.⁴²⁵ And note, if you will, that mass species extinction is effectively synonymous

⁴²⁴Actually, we have *intentionally* inverted the order here, though not the significance of impacts: A tropic cascade reverberates down the food web as a top predator is eliminated. See, e.g., James A. Estes, et. al., "Tropic Downgrading of Planet Earth," *Science*, 333 (2011): 301.

In the case of the base of the marine food chain, the case of phytoplankton is somewhat more complex. In estuaries, fjords and the coastal continental shelves where biodiversity and sea life productivity were once the greatest, phytoplankton populations have actually exploded. These regions are the most subject to eutrophication, that is, to the "input" of massively excessive nutrients from agricultural animal waste and fertilizer runoff (nitrogen) and sewage effluent and detergents (phosphates). These nutrients provide food to this microscopic aquatic plant life. Against the backdrop of equally massive overfishing of filter feeding shellfish such as oysters and clams which otherwise, but no longer possess the number to, eat phytoplankton, these forms once quickly consumed live a full existence and die. In death, they sink to the bottom and are fed on by anaerobic bacteria which utilize oxygen, using it up, in completing the process of decay/consumption. The consequence is anoxic and hypoxic waters, "dead zones" which have since 1970 become more and more numerous and extensive.* The upshot is that the remaining fish, crabs and shellfish which are not mobile die of oxygen deprivation in low (anoxic) and no (hypoxic) oxygen waters.

Three further features of this situation are noteworthy:

First, presentation of tropic cascades as a danger, as imminent, is to mistake what has already happened for what is likely: Overfishing, eutrophication and pollution have by and large led to the disappearance of oxic life from the oceans: Ecologically they are dead, even if the non-viable remnants of species remain. We can put a rough date on all this at its onset, 1950, i.e., that moment in which real domination as an epoch in the history of capital became effectually real. In fishing (overfishing), this can be laid to the activities of longlining, trawling and gillnetting.

Thus, second, the overall number of phytoplankton in the global ocean is, in fact, in steep decline.

Third, not all life forms in low and no oxygen waters die. The surface waters are still oxic, and, consuming some of the phytoplankton, zooplankton temporarily flourish only to be eaten by one of the two real beneficiaries of this situation, jellyfish. (Anaerobic bacteria are the other.) Accustomed to anoxic waters a nearly 600 million years old invertebrate that predates the appearance of calcified pelagic and benthic life not to mention marine vertebrates, jellyfish thrive, having grown exponentially in numbers over the past 40-60 years. See Jeremy Jackson, "Ecological Extinction and Evolution in the Brave New Ocean," *Proceedings of the National Academy of Science USA*, 105 (2008): 11460-11461, and Lisa-ann Gershwin, *Stung! On Jellyfish Blooms and the Future of the Ocean*. Chicago, 2013: 181-188, 276, 300, 338-344.

⁴²⁵In the case of marine life, the retrogression is actually 100 and 300 million years for large predatory fish and whales respectively. Gershwin, *Ibid*, 344.

* By early 2011 there were over 530 dead zones worldwide, portions of the Gulf of Mexico and the Black Sea being the

with the destruction of biological diversity as the foundations of life on Earth.

The Geophysics of the Earth, IV

Climate Change Effects: The Converging Crises in Nature and Society, I

The level of atmospheric carbon dioxide is now annually rising at a rate slightly in excess of 2 parts per million (ppm) molecules of air. This, the rate of capitalistically generated climatic forcing is four orders of magnitude, ten thousand times, more powerful than any current natural forcing (e.g., orbital eccentricity). The melting of the Greenland ice sheets may already be irreversible.

The West Antarctic ice sheets is undergoing collapse and the great ice pack on the east connected to the glaciers of the interior have already begun to melt. Rising temperatures will begin to melt Arctic permafrost to a depth great enough that the periodic release of gas hydrates will occur (in fact, in the northern reaches of Siberia it has already begun), portending the prospects of a truly enormous release of poisonous methane gas.

Enough heat will be generated at the surface of the world's oceans to create a warm layer thick enough to prevent cold, nutrient rich waters from rising, while at the same time the oceans will become so acidic as to prevent formation of carbon-based shell life. (This too has already begun to occur.) Warmer water diminishes the amount of oxygen that can be dissolved in the seas. The consequences will be twofold, slow suffocation of marine life and dissolution of calcium carbonate shell forms that have absorbed atmospheric CO₂ for a half billion years. Releasing carbon back into the atmosphere instead of absorbing it is a particularly insidious naturally occurring process that not only continues but exacerbates, by intensifying and increasing the rapidity of warming. This would mark the beginning of the end of oxygen respiring marine life, plant and animal, as such.

Already unfolding, continuous flooding of low-lying coast areas will incorporate them in, as part of, the sea. Inundations of coast metropolises will be regular features that recur several times annually.

Mountainous glaciers in all the ranges of the world are disappearing. Flows during the spring rising from mountain and glacier fed rivers will slow to a trickle. In these regions, drinking water and water to irrigate agriculture will not be available from these riverine sources. Drought will become permanent, desertification will proceed apace, and habitable environs will accordingly contract.

Driven not just by warming (but also by logging and clear cutting for agriculture usage), the tropic forest ecology, already rapidly disappearing, will succumb, the greatest source of biodiversity on Earth eliminated, as rainforests are reduced to scrub and eventually desert.

The basis of life will dramatically and disastrously narrow still further, while rainforest collapse will produce a loss, this time of a truly decisive carbon reservoir thus enhancing CO₂ concentration in the atmosphere, still further exacerbating warming.

Cyclonic seasons are beginning to move north. They will move to a latitude as far north as London (51.5°N, the latitudinal equivalent of the Falkland Islands in the southern hemisphere), and appear below the equator where they have not before. Their seasons will be extended five or six weeks annually. Periods of searing heat, once one hundred-year events, have now occurred (in Europe in summer 2003, this summer here and now in the United States). They will become a regular feature of summer time in once temperature zones as arid tropic climates move north and south to the mid-latitudes.

It might take over a hundred years (it might not), but melting the great ice packs on Earth will raise sea levels at least 75 meters (roughly 250 feet). Taken together, rising seawaters and increasingly intense, severe storms and possible super storms (with increasing moisture in the air and as the atmosphere heats up creating fuel for such storms) will wreck coastal built environment not merely on the order of but far, far greater than Hurricane Katrina did. Low lying and coastal areas face inundation and salination wreaking havoc with drinking water supplies: The wholesale (and not just a partial, neighborhood-based) abandonment of sea level urban metropolises will begin. This will include not just Bombay but much of coastal India and southern Pakistan, Bangladesh northeast to Dakar, not just Saigon and coastal Indochina, but all of coastal east Asia, especially Hong Kong, Shanghai, all of coastal Japan, the island archipelagos of Malay and Indonesia... the islands of the South Pacific will disappear... Borneo, Bangkok as well as Sidney, not just the Asian but the Dutch lowlands, together with Alexandra, Venice and most Mediterranean port cities, inland London, Copenhagen, Stockholm and Helsinki and their environs, not just New Orleans and Miami but the U.S. Gulf coast including coastal Louisiana, Mississippi and Alabama, a good portion of Florida, the Atlantic Carolinas and coastal and Tidewater Virginia, the

West Indies, Panama City, Caracas, Recife and Rio, inland Buenos Aires, and islands like Hawaii and the Canaries, central coastal west Africa especially Nigeria, and so on. With desertion of these areas and regions, rising seawater and super storms will witness massive voluntary and chaotic, then forced and enforced massive population migrations, the likes of which the world has never seen... Population movements (from coastal regions to continental interiors) will sharpen conflicts with in nations. They will create conflicts where they do not already exist, over access to water and food, then to housing and already minimalistic and rapidly disappearing social services. Crossing international borders, they will heighten and multiply ethnic, national and class conflicts. Ethnic cleansing, genocide, open conflict and war are likely to be regular outcomes of massive population migrations. The same movement of populations fleeing low lying areas will force the displaced into camps, no doubt proclaimed temporary, and movements across international borders will produce enormous encampments without sanitary facilities, without adequate food, and without hope. If open conflict and large-scale war develop, these camps could well become sites of slave labor, if not this, then liberal "benign neglect," i.e., mass starvation. In a highly mediated way, this is capital's reaction to the problem of global surplus population it has created...

Population migrations will not just begin from low lying coastal regions, but also from increasingly arid regions, areas plagued by water shortages undergoing actual desertification and qualitatively increased incidents of wildfires. Similar abandonment awaits areas wracked by famine which is no longer periodic, but regular and frequent, by internal conflict and balkanizations as productive agricultural lands are lost to the movement of arid tropical climates northward and southward.⁴²⁶

In the short run, climate change makes resources less accessible, in capital's language it interrupts and makes production of agricultural foodstuffs and industrial raw materials less calculable, more unreliable and in some cases impossible; it creates increasingly intolerable strains on capitalist infrastructure; and contracts the basis in earthly nature for human activity in its capitalist form.

Here we can already see and grasp the *converging crises in nature and society*:

The stress on infrastructure is readily apparent in roads and highways buckling under heat, storm damage to housing, commercial structures, etc. As for agricultural production, recall the very recent western Russian wildfires (summer 2010), the consequent poor wheat harvest and the resulting upward push on the world price of grain. Or, again, with regard to the same production and its "natural" causation, the wildfires appearing, for us, as a crisis "in" nature. At approximately the same moment, Ben Bernanke, the Fed chairman, initiated policies ostensibly to loosen credit availability as a spur to business expansion and a return to "economic growth." In point of fact, these policies have permitted banks to use funds made available by the Fed to invest where returns are highest and safest (and not to ease credit requirements, i.e., to invest in world commodities markets, in oil, wheat, gold, etc. The effects of said investments have been to generate a dramatic increase in the prices of these commodities, thus contributing to a worldwide inflation. This, in turn, was at the origins of the explosions in the Maghreb, in Tunisia and Egypt where revolts initially started from the removal of state subsidies on food, grains, and oil. So here too you see, in a more mediated manner, the convergence of a crisis in nature (wildfires, poor wheat harvests) with the crisis in society (deepening economic contraction revealed largely in unemployment, the Fed response, rising global commodity prices, the uprisings in the Mideast).

The tendential direction of these developments is twofold: First, in the near future these crises will continue to converge, to interpenetrate and exacerbate each other, to a point at which they will be inseparable. Second, all the socio-natural problems generated by climate change, as qualitative and utterly novel and unprecedented, heighten inter-imperialist rivalries, tensions and struggle: The drift toward interimperialist conflict and war appears inevitable.

⁴²⁶It has already happened. a five year long climate change-induced drought destroyed the livelihoods of over a million family farmers in Syria. These people fled to the large urban areas (Damascus, Aleppo, etc.). The regime was unable to cope with the influxes, that is unable, and perhaps unwilling, to meet the expectations and provide adequate conditions for renewal of living of these refugees. Discontent was palpable. Fundamentalist religiosity made large inroads among young men in the camps. It provides the social basis for open resistance and then war against the regime. Complexly mediated, the logic and movement and capital generating climate change* was the underlying causation of the failed CIA financed jihadist attempt to dismember Syrian and overthrow Bashar Assad.

* See Part II, the section which follows.

Part II

Capital and the Crisis in Society (in Nature)

If the despoliation of nature, mass species extinction and, in particular, global climate change are grounded in the dynamics of capitalist development, it is necessary to explain the nature of capital and those dynamics. To do so requires we pinpoint that moment at which capitalist development came to rest on its own foundations, at which it began to exhibit itself purely as itself without being shaped by historically prior forms of productive activity. In this way, we can identify capital as capital and its relation to climate change can stand out in sharp relief. If nature domination is *not* a contingent series of processes and events, if it is a necessary outcome of capitalist development, then it is precisely under these historical conditions that their relation began to form.

Capitalist Dynamics and the Domination of Nature

Under favorable market conditions, particularly increased demand, the capitalist employs more workers. The increase in demand also leads to expansion of the scope and magnitude of production. At a certain point, a point different for each industry and at least initially in the historical sense for each capitalist, this growth in the sheer quantity of capital invested commits the capitalist (who hitherto had simply provided means and materials of production to "his" laborers) to directly taking control of the process of production itself. This commitment transforms him from a merchant into an industrialist, a capitalist who actually interjects himself into and organizes the forms labor takes in the workplace, and who alters the means of production by utilizing new technological inputs (machinery). The capitalist now preferentially extracts surplus value by means of increases in the productivity of labor. He loses his individual character, i.e., he increasingly behaves as a personification of capital (as labor itself becomes increasingly abstract), while capital itself assumes direct social proportions. Production itself elicits a growth in population, new branches of industry that burgeon and diversify their subspheres, a greater productivity of labor and cooperation of labor on a mammoth scale, and an increasing mass of existing and new commodities. Each of these features in turn calls forth the others. This, in the strict sense, initiates the specifically capitalist mode of production (or the real subsumption of labor under capital), *real domination*, and it institutes capitalism, capital, on its own foundations.

What makes real domination irreversible, and makes it possible to speak not merely of real domination in production but as a periodization in the history of capitalism, is not the *increasingly detailed* division of labor itself (though in its scientized form it is an expression and development of real domination) but the *systematic*, sustained incorporation of science and technology into production: For it is scientific inputs, for example, fertilizers in agriculture (which would not be conceivable with chemical analyses of soil and plant growth, and the manufacture of new substances) and mechanization in industry that have made abstract labor so enormously productive. It is these "inputs" that revolutionizes production and, following on *inter-capitalist* competition which in turn demands the inputs (it is either this or face ruination), permits capital to develop on its own basis and thus allows us to speak of "production for production's sake" or the "self-valorization of value."

Characterizing real domination and directly mediating the vast increases in the productivity of abstract labor, science and a separate technology are not simply incorporated into production through introduction of novel inputs (machinery). The modern science of nature is simultaneously and at all times (incessantly) incorporated into the work processes by direct intervention of the capitalist, now as a personification of capital, by way of work's *reorganization* and the direct management of production. The vast array of supernumerary personnel attached to capital – foremen, supervisors, technicians and administrators lording over workers and production – mediate those machine inputs and the rationalized work processes achieved on their bases. They do so as bearers of measurement, calculation and classification (originally development in the sciences of nature and mathematics), as bearers of scientific methods, concepts and rationality imparted to (imposed on) workers – by setting production norms, through speedups, in harassment – already captured in machinery (i.e., in worker motions and rhythms broken down into abstract components objectified and materialized in e.g., sequentially arranged, continuous flow production). Increasingly, these personnel themselves are expelled from production: The functions they themselves perform (measurement, calculation and classification; setting production norms, speedups, etc) are more and more objectified and materialized in digitally governed machinery such as artificially intelligent robots. The function of supernumerary personnel, and the machines that succeed them, and role in production as production for production's sake is reunification of fragmented work processes (with a view to the production of a whole product), reunited hierarchically with all layers

of supervision and management subordinated to the capitalist. Though it is infrequent, task fragmentation and reunification (scientific management, Taylorism) can be achieved without mechanical inputs. The point to note is the underlying unity of science and capital: Once established, both (in their *seemingly* separate historical movements) develop on the dual basis of rationalization of activities and the homogenization projected by science (wherein nature appears as contentless extension that is quantitatively determined in the strict, i.e., mathematical, sense) and produced by capital (which recreates humanity as *Teilmenschen* and nature as raw materials basin). Science and capital come together most immediately and directly *both* in the production of machinery, *at the start of commodity production*, utilized in mineral extraction (the end process of which is mountains gouged with open pits, seams split down their sides and mountain tops torn off), in logging (which leaves forests shorn of trees that have been ripped out of, uprooted from, their moorings *en masse*), in earth moving (in which hills and valleys are leveled, prairie fields are denuded, native plants and animals disappear, the former dead, destroyed, the latter forced to move, find new habitat in ever more narrow, confined spaces, and as an overall consequence also likely to die), and in the production of fossil fuels (in which sea bottoms are plumbed in miles of interconnected lines from which toxic substance inimical to marine life are periodically released). Science and capital come together, furthermore, in the disposal above all of non-biodegradable, petro-chemical products (plastics of all sorts). They, in fact, come together *throughout the course of production and at the end of commodity consumption*, as waste dumped along streets, roads, woods and forests, lakes, streams and rivers, seas and oceans. Determined from the regular, intensified introduction of science and technology into production, from that moment real domination began to effectively hold sway over the world, capitalism has developed and can only develop through the destruction of the self-organizing cohesiveness and otherness that is earthly nature (which is the very premise of vital and human life) by destroying it in its objectivity, reconstituting it as a sink of unprocessed supplies, a standing reserve of matter whose meaning and existence, for it and largely for us, is exhausted in being reworked in capitalist production.

Capital and the Dynamics of its Development

Methodological soundness requires we take conflicting class subjectivities in production (not preconstituted things, relations, or institutions such as commodity, or the value form in its givenness) as our point of departure and aim at an account of the logic and movement of capital. Why? Because this is form of a return to "foundations," that is, to living, concrete subjectivity as the basis of the understanding of the world, and it is this form of presentation, and it alone, that is theoretically adequate to such a project. That revolutionary communists today explain capitalist dynamics starting from a systemic tendency for the rate of profit to fall, in relation to a high organic composition of capital or, for that matter, as a fundamental contradiction expressed in terms of the unhinging of the creation of real wealth from the production of value indicates they have no genuine interest in a general emancipation (not to mention salvaging its geological basis), either that or they are confused and incoherent *and*, proverbially, part of the problem not the solution. As a matter of integrity and coherency we shall pursue the point of departure we suggest, and ask, "What is capital?"

To start, capital is above all a social relation between groups of wage laborers and those who employ them, at the same time the production process in which this relation is formed and which it forms, and a product of this relation...

Generally speaking, the labor that produces commodities is abstract or, as we say, reduced: Under conditions of capitalist production, human labor is generalized, quantified and as such measured in units of quantitative time. Expressed from the perspective of actual production, the labor of a worker making a product (or participating in the making of a product) has been reduced to quantitatively measurable, temporal units.

If the concrete, purposive labor of a worker is purchased by an employer, a capitalist insofar as he makes

such purchases, then it is not even concrete labor that is purchased. Labor as a commodity is "labor power" or the worker's capacity to labor, since it is not the concrete, useful product of work the employer is interested in it, but the profit, the surplus of "value" or, prosaically, return over investment, that can be realized by selling this product, any product, as a commodity. Capitalist production renders concrete labor abstract, i.e., generalized or unspecific, temporally quantified, materialized and objectified as "value."

Capitalists as a group, by and large, rarely achieve exclusivity in the sale of their commodities:

Monopolies obviously exist but the mass of capitalists face competitive conditions when seeking to sell their commodities in the marketplace. Except under occasional conditions of product scarcity (which is a contra-historical, ideal condition opposed to the actual tendency, product superfluity, of capitalist development), capitalists must confront other capitalists who attempt to market similar if not identical commodities. Accordingly, capitalists must at least match or better the price of their competition. In markets where commodities sell largely as commodities regardless of their specific uses, a condition is reached that typifies the tendency of market competition, one that illuminates the uniquely capitalist conditions under which commodities are produced: Fearing competitive ruin, capitalists strive often frantically to achieve a cost advantage in the production of their commodities. Profit can only be realized if from the capitalists' perspective costs of production of a commodity are lower than the average in the industry in question. (That average is, of course, the socially necessary labor time embodied in a given commodity.) While occasionally there are individual capitalists or firms that achieve a competitive advantage in costs of means of production and raw materials, those costs tend toward an average for entire industries. Competitive advantage can be gained by introducing new machinery or technologies into production, but this may be beyond the means of an individual capitalist or a firm; but it can also be gained in reducing labor costs (pushing workers to fight back), and this is not beyond his, her or its means. Capitalists exert great effort to drive down labor costs. If successful, this reduction ensures profitability because those costs have been driven below what is socially necessary to produce a given commodity. Since the distinguishing feature of commodities as commodities is their "value," i.e., abstract and general, temporally quantified, and materialized labor, the reduction of labor costs is constituted through decreasing the amount of time that is required in production (of the commodity in question) without an equivalent compensation to those who are producing (it). The decrease in time required in production of a specific commodity (i.e., an increase in the productivity of labor so-called) can be achieved in two ways (or by combining them); first, by lengthening the working day in order to increase the mass of commodities produced (formal domination, absolute surplus value extraction); second, by reorganizing, or incorporating new machinery into, the work process in order to produce the same or a greater mass of a specific commodity in a shorter period of time (real domination, relative surplus value extraction).⁴²⁷ All ways allow, obviously, for the production of more commodities. But in all cases, there is no increase in productivity unless workers are uncompensated for the increase: This uncompensated relation, which is an essential, necessary feature and structural condition of capital accumulation and hardly an arbitrary act, we call exploitation. The excess of value (surplus value) created through increased productivity is realized as such, and appears phenomenally, when the commodity is sold. Profit, actually excess (surplus) value, can now be returned to the capitalist.

This effort (to drive down labor costs to competitively position herself in the marketplace to secure profitability) gives a special meaning to the abstractions in and through which concrete labor (purchased by the employer as the mere capacity to labor) is reduced. For the siphoning off of living labor's capacity to labor, the expenditure of labor's time in production, and not the formal act of exchange of capacity to labor for money, is the actual process in and through which concrete labor is abstracted and reduced: A worker's sensibility, affection, corporeality, experience and reflection are all irrelevant to the production of commodities; in fact, as a rule they get in the way, impeding capitalists main object, producing at a competitive advantage by lowering labor costs. During actual production, on the shopfloor, the assembly line, in the office, etc., these abstractions (in the form largely of speed-ups, imposed production norms, harassment, and subjection to machine rhythms) are constituted. They are, to be sure, repressive. Work under conditions of capitalist production renders labor for capital. It is a social process in which occurs that miraculous transubstantiation of specifically human aspirations, concerns, sensibilities, and even mundane human products (such as sweat), into abstracted and generalized, quantified, objectified and materialized, emptied (socially necessary) time, i.e., into "value."

The following are moments in the production of commodities: The entire work process itself which produces commodities. This includes the "inputs" in terms of means of production (tools, instruments, machinery and other equipment) that are directly used in the production of commodities. It also includes, purchased as commodities, goods (raw materials) that are incorporated into a final product during the work process. The housing (plant, warehouse, office, etc.) employed in the production of commodities,

⁴²⁷Reaching beyond production to all of society, as real domination has qualitatively deepened capital has poured itself into the psyches of individuals themselves. This "effort" consists largely in integrating the need and affect structures of concrete workers (and beyond them, all classes in society). The effort always is driven by the logic of capital, phenomenally, by the requirement of avoiding overcapacity, overproduction and a crisis in production which starts from here.

too, are moments in the production of commodities. So are the institutional forms (firms, corporations) that make up the socio-legal framework in which commodities are produced. As is, the money on the basis of which these various components of the production process are purchased. Because they each and all are employed or engaged... but only to the extent they are so utilized... in the production processes in and through which capitalism as a system is created and reproduced, they are all capital.

This is capital's real being: Capital is value, i.e., congealed, abstract and general, quantitatively temporalized and objectified labor. It is simultaneously the valorization process i.e., the social relation of workers and capitalists. The latter includes, on the one side, the practices in and through which abstraction takes shape (namely, the valorization process proper in which the capacity to labor is reduced and reappears as value embodied in commodities), and, on the other side, inseparable and only analytically distinct, the subordinate work process, its various moments and elements (means of production, raw materials, etc., listed above) as well as its useful end products. The entire cyclical process of capital's formation and development (its production and reproduction), in other words, its logic and movement, constitutes society's intelligible structure; capital constitutes society's "real" "subject"...

Because each and every capitalist seeks to drive down production costs and, to do so, brings new machinery to production, the amount of socially necessary labor time embodied in each commodity changes: Over time, it declines (as the mass of commodities produced increases). Because this decline also confronts each and every capitalist as an objective necessity, an event of a total societal production process utterly beyond her control yet a product of each and every capitalist's efforts to reduce production and specifically labor costs, we call *this objective necessity the logic of capital* ... Each capitalist is compelled to produce more to compensate for declining prices... *This compelling necessity, this logic, creates capitalism as a system, as an interconnected, interlocking production-based network of behaviors, practices, processes and institutions that incessantly undergoes change and development (expansion and quantitative enlargement). It is this change and development of capital (it is cyclical) that we call its movement...* The all-around increase in production leads to an impasse, to a situation in which, considering their enormous mass, not all commodities available for purchase can find buyers... *While the effort to understand this crisis of overproduction makes visible the logic and movement which form the dynamics of capitalist development, it is on the basis of the logic of capital and in and through its movement that the domination of nature is achieved...* Enormous resources are poured in avoiding just such a crisis of overproduction. (Think, for instance, of the tremendous amounts of profits that are funneled into advertising campaigns in order to create novel needs to absorb the mass of potential commodities already producible with existing productive capacity.) But the real dangers of a crisis of overproduction (actually and essentially, one of "under" or insufficient production of surplus value) are depression, social unrest and war as the last hundred and twenty-five years have shown. Considered solely in terms of the logic and movement of capital, however, the crisis of overproduction is an intrinsic, necessary phase of capitalist development: Two forms of crisis resolution stand out: First, there is the characteristic and ubiquitous underutilization of productive capacity during a depression which results in massive deflation, a collapse of existing prices which effectively devalues vast amounts of existing capital. Second, there is war which produces an equally enormous destruction of capital in its sensibly embodied forms (human life as potential capacity to labor, buildings, machinery, raw materials, and commodities). Resolution of crisis may entail the bearers of these social relations (especially workers killed in fighting, cannon fodder the precise analog to nature as raw material) are now different, but this destruction of achieved levels of objective substance permits the production process in which and through which the entire system of social relations we call capitalism is formed to renew itself, that is, to begin anew.

What reemerges (and is synonymous with renewed expansion) is, of course, precisely the logic of capital (or, if you prefer, of accumulation), that is, the activity of competing capitalists out of which originates that compelling objective necessity that subordinates each and every individual capitalist. This suggests that not only is capitalism a system of social relations beyond the control of at least one group of bearers (capitalists) of these relations... they have, as we point out below, become in all significant historical events and actions mere bearers of capital's logic... it suggests that the very movement of capital that creates capitalism as a system is movement by way of wrenching contraction and expansion. Capitalism unfolds and develops through this cyclical process of rapid growth and retrenchment, expansion and contraction, boom and bust. Thus contraction, then, crisis *appears* as a product of overproduction, an inability of existing markets to absorb commodities as products of existing (productive) capacity. Yet in the systematic sense, it is a product of an inability to realize surplus value through exchange, that is, a

product of the insufficient production of surplus value. Such is the outcome of techno-scientific innovation that is created by capitalist competition: It makes too much labor-power superfluous, makes it impossible for capitalists to valorize adequate amounts of abstract labor to sustain production at existing levels of development of productive forces.

In all this, the capitalists, owners or employers who pursue the production of commodities, and the firms in which and through which this pursuit is conducted, behave in identical ways regardless of their personal thoughts, feelings and pronouncements: In all struggles against workers and in all socially significant events, capitalists behave as if they merely personified the abstract economic categories that describe the logic and movement of capital. They behave in this manner because they have fully internalized and assimilated this logic and it governs all their actions. It is for this reason that we speak of capitalists and firms as mere reflexes of its movement, as personifications of its logic, as *capital*.

The Geophysiology of the Earth, V Capital and Climate Change Causation

The entirety of the humanly formed built environment as it exists today within humanized, earthly nature, and the social relations in which production, institutions and ideas are all formed, is an outcome of capitalist development. The subject of this societal development is a process without consciousness or intent, a systems logic that governs this development, one personified by individuals and social groups that have assimilated and internalized this logic. This is the overarching context in which climate change unfolds, for at this historical moment the latter encompassing "event" is still comprehended by the movement of capital.

It is not as if global warming has never occurred before. Over the course of tens of thousands of millennia down to, say, the last 30 million years, carbon dioxide concentrations had on several occasions reached well in excess of a 1000 ppm.⁴²⁸

But, then, those occurrences took place on an entirely different Earth, one on which a far less luminous sun radiated (and thus one on which elevated atmospheric CO₂ concentrations helped maintained temperatures suitable to complex life forms), but one that would not support the most complex life forms (mammalian life, especially human life) as they exist today...

The essentially universal consensus among scientists, and if not among all "leaders" of capitalist states in the world today (though among the most recalcitrant of states, e.g., United States, Brazil, Australia, there is no acceptance just ideological denial which clings tenaciously to fossil fuel capital), is that climate change is real even if in terms of causation not all statesmen so-called agree "man" is responsible for warming induced climate change. While we shall return to the mystifying concepts of "man." For now, though the evidence is straightforward, the attribution both of culpability *and* the liable agent are effectively, as we stated, ideological, masking real agency and responsibility.

Consider the evidence.

First, current, *ongoing* climate change is a not a "natural" phenomenon: With a view to Milankovitch cycles, it is countercyclical, meaning that it is *not* what is to be expected as the outcome of the geologically contemporary ice age glaciation: Presently, the eccentricity of the Earth is greater than 6,000 years ago (i.e., Earth is presently at a further distance from the sun in the course of the 100,000 years it takes to complete its elliptical orbit); and at this point in that cycle, orbital forcings are to be expected, i.e., we should be see indications (e.g., growing ice formation at the poles and at very high altitudes, transformation of snow fields into incipient glaciers) of a renewal of glaciation.⁴²⁹ But what we are actually witnessing, to the contrary, is worldwide warming.⁴³⁰ This in itself is stunning.

⁴²⁸And, at different moments in Earth history, vastly higher. At the onset of Cambrian 540 million years ago (mya), global carbon dioxide levels were at roughly 5500 ppm; at the "moment" of the late Devonian extinction about 360 mya, they were a little less than 4000 ppm; by the time of the Permian extinction circa 249 mya these levels were just in excess of 3000 ppm; during the Jurassic-Cretaceous boundary, say 150 mya, they had fallen to just under 2000 ppm; at the Paleocene-Eocene boundary 55 mya, these levels had dipped to about 800 ppm. For the next 53 million years those atmospheric CO₂ levels continued falling, having dropped enough, to 180-200 ppm, to trigger cosmological determination (the orbital relation of the Earth to the sun and bring on a glaciation. Causation can be attributed to weathering. For this, see Part III, "Geophysiology of the Earth, VI," below

⁴²⁹William Ruddiman, *Plows, Plagues and Petroleum: How Humans Took Control of Climate*. Princeton (NJ), 2005: 99-100.

⁴³⁰In the current interglacial, the Earth reached it maximal point of proximity to the sun 11,000 years ago. Northeast Canada (from Baffin Island north to Ellesmere Island), as an elevated block of land a center of glacial nucleation for the North Hemisphere, though forming permanent snowfields in the recent past has failed to witness the formation of glaciers, circa 2003 (instead beginning around 2007 the region has been undergoing extensive melting). Glaciation

Second, series of radical, far reaching and sweeping climate change events have in the geologically reconstructed past... resulting in those mass extinctions that, for example, constitute the Permian-Triassic and the Triassic-Jurassic boundaries... occurred over several million years (e.g., roughly 12 million in the case of the P/T boundary.) The current transformation concentrates a greenhouse gas based warming and an ongoing mass extinction within the same brief *historical time frame, essentially a human lifetime*, an event for which there is no precedent in earthly nature.⁴³¹

Third, from the outset of the current interglacial some 11,600 years ago down close to the advent of real domination in production, the Industrial Revolution so-called, CO₂ emissions (driving average global surface temperature increases) have risen slowly, very slowly, but steadily. This increase, it should be noted, is relative: Plot atmospheric carbon dioxide concentrations against chronological time from the peak of the last ice age (last glacial maximum) 22,000 years ago down to 1765 in the common era, and that incremental increase is not noticeable (and from about 11,600 years ago to 1765 in the common era it remains unnoticeable). But plot those concentrations from 1765 to 1870, and the plotted line approaches a positive 15° angle of incline. Plot those concentrations from there to the present and the angle of incline rises to roughly 45°. Back up and plot it from 10,000 years ago to the present, and those last 235 years present a nearly straight vertical rise. *The current rate of atmospheric CO₂ increase is not merely the fastest in the geologically recent (two thousand millennia old) ice age, this rate is the fastest rate of increase reconstructively known over the whole span of the last half billion years, for the present rate of increase is about one hundred times faster than those geologically ancient rates...*

We mark the beginnings of sedentary agriculture and pronounced social division at about 10,000 years ago, for it is there that of highly stratified societies based on material inequality that would give rise to the state could be said to have formed. And the year 1765 in the common era marks that point at which we can date the commencement of the mechanization of industry in the West (i.e., in capitalist England), that point from which we date the origins of the real domination in production of capital over labor. In the former case, initial agricultural life and with it rising population began to generate a human input, methane (CH₄) and carbon dioxide (CO₂), into the atmosphere, nothing that before 1765 might significantly delay a glaciation, but incrementally over the entire period noticeable. The development of capitalist industry after 1765, however, has indeed transformed the chemical make-up of the atmosphere. How?

On a geological timescale, atmospheric CO₂ concentration has ranged from lows of 180-200 parts per million (ppm) of atmospheric air during the major glaciations of the current ice age to highs of 280-300 ppm during warm interglacials. Today, atmospheric CO₂ concentration stands *nominally* at 390 ppm (if methane, nitrous oxide and CFCs are factored in, effectively those levels are currently... as of this writing, August 2009... at 430 ppm), and is rising in geological terms at an extraordinary and unprecedented rate with at this moment no end in sight. We suggest the moment at which Arctic ice cap melting will qualitatively hasten and become irreversible might have already occurred; the moment. We suggest the moment at which gas hydrates (clathrates) might dissociate from their ice-like structures is as low as 460 ppm, reachable with even moderate emissions reductions within a decade and long, long before the conventional *and* mystifying consensus estimate of 2080, designated at any rate to forestall immediate, decisive action.

These, then, are the major pieces of evidence for anthropogenic based warming so-called. Consider, now, the attribution of agency and, accordingly, responsibility for climate change. The UN's IPCC (Intergovernmental Panel on Climate Change) identifies "human activity," "man," as the agent altering climate. In one sense, a very crude argument can and has been made (though not explicitly by the IPCC) that sheer human numbers, a global population of six and a half billion, and the outputs that result from the volume of activity of so many people, bear direct responsibility. This is the *bête noir* of the Malthusians who are so commonly found in the scientific climate change community. All those teeming masses in the capitalist periphery and the new centers of capitalist development along the Asian industrial arc want to live like us, Europeans and Americans.⁴³² That, it is abstractly argued, would be

patterns derived from ice cores and mathematical calculations based on Milankovitch precession and obliquity cycles all suggest that, most visible in such a region, glacial nucleation should have begun 6000, no less than 5000, years ago. William Ruddiman, "The Anthropocene Greenhouse Era Began Thousands of Years Ago." *Climatic Change* 61 (2003), 261-293: 287-288

⁴³¹Stratigraphic evidence indicates the *impact* extinction (product of an asteroid collision) that formed the Cretaceous Tertiary (K-T) boundary some 65 million years, lasting no more than 200 years, was the only other *known* rapid mass, or catastrophic, extinction that has occurred on Earth.

⁴³²Similarly, *The Critique of Science*, the Final Study, Part I, "The Defense of the Argument" (footnote), and Part IV,

disastrous. While *the quality of human (and animal and plant) life may well be grounds for limiting population growth*, global warming does not result merely from the activity of masses of humans at any level of development: As late as 2008 an Indian child living on the subcontinent in some of the most densely populated regions on Earth, consumed nearly two orders of magnitude less, $1/90$,⁴³³ of the annual

energy that her American counterpart did. Patently, the problem is not consumption without regard to societal and historical context, but forms of consumption, in particular, not merely energy inefficient but profligate consumption, and (even within capitalism) the socially and historically specific forms of development that underpins that consumption, i.e., the problem is capitalist development or, preferably, the movement of capital.⁴³⁴

Human population, either in the contemporary sense or the historical sense (going back some 10,000 years) or both, is, then, neither the agent nor is it, accordingly, responsible for climate change. "Man" (here, the abstraction human "population") as such, or even the "species," is merely a formal concept without determinately real referent. Grant the force of this argument and one mystification dissolves. Perhaps, then, the "industrial system" is at issue? Or, perhaps, it is a question of "man" in the "industrial system"? In either case, we are dealing with empty abstractions. The issue is the historically specific configuration of groups of living men and women working within that "industrial system," i.e., capitalist production. More precisely, the issue is the group that dominates that production. We refer, here, to those personifications of economic categories, capitalists (as well as the bloc of classes they have in tow including their intelligentsia, scientific social groups). Capitalists (and states that unify their most important but otherwise disparate or competing capitals) make decisions concerning the allocation of monies and capital, concerning what and the manner in which "natural resources" are exploited and utilized, and concerning the technologies on the basis of which those activities are carried out. Still, to stop with just those decisions inadequately addresses the issue; for it is the dynamic structuring the "Partisan of the Monera."

The argument is patently ideological, a reflex defense of existing *haute bourgeois* privilege: Raising global levels of consumption would be disastrous because the Earth's human population already consumes 40% of the planet's primary productivity generated annually by living species.

⁴³³Yet domiciled *not just* in the plush suburbs of US, Canadian (and Mexican), British, European and Scandinavian cities, but in (sub)urban *Lagers* of great Eurasian (Petersburg, Moscow), East Asian (Seoul, Tokyo, Osaka, Shanghai, Beijing, Shenzhen and perhaps a hundred more), and Southeast and South Asian (Singapore, Bangkok, Kuala Lumpur, Rangoon, Jakarta, Delhi, Hyderabad, Calcutta), and Australian cities, in the oil rich kingdoms of Arabian Peninsula and the Persian Gulf, the Middle East (Tel Aviv, Beirut) and Africa (Cairo, Nairobi, Johannesburg, Capetown) and in South America (Sao Paulo, Rio, Montevideo, Buenos Aires, Santiago), the wealthiest 500 million people on Earth, a mere 7% of world's population either owning or attached directly to international capitals and to powerful states, account for about half of all (~50%) of global emissions [and perhaps as much or more of global consumption]. Stephen W. Pacala, "Equitable Solutions to Greenhouse Warming," Presentation to the International Institute for Applied Systems Analysis, 11/2007: 3. Pacala is director of the Princeton Environmental Institute and co-director of Princeton University's Carbon Mitigation Initiative.

⁴³⁴On more than one occasion, we have been censored for not citing a source for this figure (1/90). Beyond remarking that it was offered in a morning interview and discussion on Minnesota Public Radio in spring 2006, we cannot further reference it. However, we can note the following:

With a combined population of 235,700,000 in 2005, i.e., better than 3/4 (78%) the population of the United States in the same year, Kenya, Democratic Republic of Congo and Nigeria, countries with high population growth rates (respectively 3.2%, 3.0% and 2.8% annually for the period 1980-2005), had a combined per person emissions rate (measured in tons of CO₂ per capita in 2005) that was 1/84 that of the United States, a country with a far lower rate of population growth, which was 1.3% per annual for the period, 1994-2001. (With a population roughly 20% of the United States in 2005, the per person use of CO₂ in Democratic Republic of Congo was one one-thousand, 1/1000, of that per person consumption in the United States!) See David Satterthwaite, "The Implications of Population Growth and Urbanization for Climate Change," *Environment and Urbanization*, Vol 21, No 2 (October 2009), 545-567: 551, 553 (for the figures provisioning our calculations). Of course, these figures incarnate only a statistical average, and, to be sure, levels of CO₂ consumption vary vastly among different strata in the United States and across *the old metropolitan capitalist world*. (See the footnote immediately above). However, in this respect we are also required to remark that *this world's megalopolitan infrastructure organization and distribution of water, gas and electricity, specifically its gigantism and centralization, necessarily requires redundancies and enormous inefficiencies that generate an unparalleled profligacy which needlessly raises levels of consumption, including those of the most impoverished strata even as they are nonetheless left materially unintegrated.*

* Democratic Republic of Congo population in 2005 was 58,341,000 with a per person annual use of .04 tons ("Ibid," 553); US population in 2005 is calculated using a figure of 300,353,000, while annual per person consumption was 200 times that of other national rates of .2 tons per person ("Ibid," 551)

entire system of social relations at the level of the world (i.e., the logic and movement of capital) which is creating and sustaining climate change. In this sense, it is *the subject of society (a part of nature yet confronting it as a raw unprocessed materials sink for the capitalist production of commodities) that is the agent has brought climate change into being and creates it as the dominant reality of our time*: It is not "man" that is remaking, as it were, earthly nature at its surface; that remaking is a product of her own objectified and estranged power. "Man" is *not* that subject: Instead, that subject is the empty logic of production for its own sake, self-valorizing value, in other words, capital which, cannibalizing human creativity (beginning with its waged labor reduction or abstraction in production, i.e., beginning with a form of violence and repression specific to the labor processes of capitalism, that is, with valorization, with the transformation of concrete, living labor into congealed, abstract and general, quantitatively temporalized and objectified labor as the formally first act in its own creation), is, as an objectified and alienated human power, the real subject of society effecting planetary climatic transformation.

Part III

Science, Technology and Capital

The relations between capitalist dynamics and climate change *cannot* be adequately grasped without accounting for the central, nay, the absolutely decisive roles of science and technology in facilitating and deepening this relation. It is a central (productivist) mystification of our era to believe otherwise, and it is endemic to Marxists as it is to any other group, including the pivotal classes in society.

Science and the Bourgeoisie, Technology and Capital

Though it is common *productivist* error to grasp the connection between modern science and abstract labor in terms of the general development of society, hence to see in science the intellectual patrimony of humanity, it remains an error. Most emphatically, science is neither.

What the foregoing as a whole (i.e., *The Critique of Science*) demonstrates is the immanent and necessary of the bourgeoisie (and capital) to the modern science of nature. Our presentation permitted us to first, based on struggle by the contending sides, apprehend a vision of the world (man, nature and community) embedded in modern science which is distinctively different and counterposed to that of the old social order, an order the organization of which was theoretically expressed in a basically Aristotelian (Scholastic and later Peripatetic) nature philosophy;

second, grasp that the internal conceptual structure of science itself in *its* structural similarity to the value form;

third, make visible the homology between the original, social and precognitive *telos* of science at its origins and bourgeois tasks which, driven by the logic of capital a frenzy to accumulate, are expansion of productive forces; and

fourth, recognize that the validation of scientific laws is not epistemologically grounded in internal scientific procedure or method (such as "falsification"), but in point of fact (and as a theoretical necessity) transpires in the order of society through technological achievements linked to expansion of productivity.⁴³⁵

By instead of simply recapitulating, virtually verbatim, the argument of *The Critique of Science* (the Introduction), anticipatorily formulating the demonstration which unfolded during the course of this work as a whole, here we shall merely premise ourselves on that demonstration, grasping and acknowledging the constitution of science as theory is indissolubly linked to production of the socio-historical world we call capitalism. What remains, then, is a similar account of the internal and necessary relation between the modern science of nature and modern, a separate technology..

Techné, I

Capitalism and Technology

In the millennia old history of humanity, the question of technology had never been, and could not in principle be, posed before the genesis of capitalism. In particular, it could not be posed before the development of capitalism on its own foundations and the recreation of human creativity in work as, first capacity to labor (labor-power), then abstract labor. *The actual historical condition of the very possibility of this reduction depends upon the separation out of an "economy" from other as yet undifferentiated spheres of social life* (and their constitution as separate spheres each with distinctive norms governing

⁴³⁵This couldn't be clearer than in the latest rendition of biological science. See the Final Study, Note₂ ("Molecular Phylogenetics and the Full Reductionist Program: Eugene Koonin's *The Logic of Chance*"), above.

behavior and expectations), and its formation as an autonomous regulator of the totality of that life.⁴³⁶ That is to say, this reduction is contingent upon the constitution of a system of social relations founded upon and continuously reproducing abstract labor: It has, dialectically, as its condition the simultaneous constitution of capitalist society. For capitalism under conditions of qualitatively deepening real domination over all society, technology and its development is of the essence of the "productive forces of humanity." The assumption that technology (or, for that matter, productive forces, i.e., objectified and materialized human activity in the form of instruments deployed in materially renewing social life, in production) is at all times in all places an objectively *separate and distinct* feature of human society in its relation to surrounding nature is mistaken. It is erroneously *because* it retrospectively projects this recent historical development, the formation of distinct spheres of activity and daily life (primarily the economy, but family, military, organized religion, formal education, etc) with standards specific to each governing behavior and activity out of institutionally undifferentiated, societally precapitalist wholes. (Those precapitalist wholes were characterized by *functionally* distinct activities that may have corresponded to stratification within a division of labor). And, it is mistaken *because*, even more recently, the coal-oil-auto productive complex on which current thinking about the transformative "essence" of "man" in relation to nature is based is historically specific, an even more recent development. This error renders the claim that technology is a separate and distinct ensemble of procedures and practices in human society an illicit generalization or, if you prefer, an ontologization.

Thus, prior to the creation of institutionally distinct spheres of society beginning with an "economy," technology *as such* had no separate existence. It is the systems driven compulsion to accumulate... generated by the activity of individual capitalists pursuing their own particular interests... that necessarily leads to rationalization of activity devolving on institutionally separate spheres in society. Within this development, technologies are created through the conscious pursuit of formalized and codified means, procedures and processes that enhance capital accumulation. Simultaneously capitalist imperatives are sensuously incarnated in and govern the operation of the machine-complex and, or, laboratory internally constituting the technology in question. This is the case, even if that enhancement is seemingly, ostensibly and inseparably aimed at, e.g., sustaining medically disabled or diseased populations, space exploration, improvement of athletic performance, etc. Under conditions of the real domination of capital in production, this pursuit was first done scientifically, and today scientific activity is increasing reduced to producing novel and refining existing technologies of capital in all spheres of society.

Every stratified social formation in history, and every established and distinctive undivided community as well, had its own ensemble of technics. This is a historically valid assessment even if has there has never been a social consciousness of a distinct technological sphere. Until the appearance of modern capitalism, there had, in fact, never been one for good reason: None existed. Instead, respective technical ensembles were bound up with, intertwined with and inseparable from an array of activities, productive, cognitive and otherwise all of which may have been understood religiously, mythologically, politically in terms of a powerless chief, etc...

Accordingly, it is only abstractly, and solely from a modern, capitalist perspective that we can speak about various historical forms of technics as socially dominant, instrumentally practical forms of our relation to nature that simultaneously express the mastery of a hegemonic social group, stratum or class in society. Across the whole era of divided societies stretching from the origins of agriculture, and the appearance of social stratification culminating in the formation of the state down to the present, both assessments are historically valid. To boot, from this perspective all technical ensembles express social imperatives. Still, more forcefully, all technical ensembles embody and congeal social relations animated by a social group, stratum or class teleology, a teleology actually borne by and informing individuals (reproduces relationally determined as elements of that social group, etc) whose daily activities reproduce the technical ensemble as such. Respectively ascertained, technical ensembles are neither "neutral" nor "purely instrumental" lacking in social content: This holds even more compellingly for contemporary technology, i.e., technologies of capital and, taken together in their essential unity, capitalist technology.⁴³⁷

So how do we distinguish capitalist technology from all forms of premodern technics? We have already

⁴³⁶Discussed as such in *The Critique of Science*, Interlude, "Real Domination and Autonomization of Capital."

Writing from within an entirely different tradition, the economic anthropologist and bourgeois theorist Karl Polanyi, *The Great Transformation* (Boston, 1944), arrives at substantially similar conclusions

⁴³⁷*Bolshevism and Stalinism. Urgeschichte* (St. Paul, 2015), Theoretical Note (*Bourgeois Themes in Bolshevik Doctrine*), "Trotsky and the Militarization of Labor, II," "Lenin: Theoretical Fount of Bolshevik Doctrine, I," "Lenin" Theoretical Fount of Bolshevik Doctrine, II," and "Conclusions.

discussed two features of this characterization to which we shall briefly return. Consider a third.

Premodern technics were by and large organically grounded, either as a projection or extension of human organs (hand, arm, leg) or on the model of the motion of such an organ (or even animal motion). For example, a saw is originally modeled on a row of teeth, a hammer on the fist and a chisel on a fingernail. Even where something novel, an occasional technique or instrument that was non-organic, appeared, the ensemble of technics was heavily weighted to the organic side. Thus, the technology itself was organic. With modern technology, however, this changes. While instruments that are organically grounded continue to be utilized and to appear in the epoch of bourgeois civilization, the tendency especially with regard to machine technology is for the invention and production of instruments and technics that are non-organic or "artificial." For example, a sewing machine neither resembles (that is, is not modeled on) a seamstress who sews by hand, nor does it operate in the manner that she does; a gasoline-powered automobile has no analogue in the human body or the natural world. This tendency toward "de-organ-ization" makes the peculiar character of modern or a separate technology possible⁴³⁸ ... it fully appears once means of production regularly (not infrequently, not occasionally) enter exchange, once they become pervasively commodified with the social generalization of capital's formal domination, and this de-organ-ization is a development cognitively based upon historically new orders of conceptual abstraction that have been, and continue to be, achieved in scientific efforts (beginning from physical theory linked to mathematics) to penetrate ever deeper the "inner essence" of nature.

The modern science of nature is the cognitive, and indivisibly and indissolubly modern technology the practical-instrumental, historically specific form of our relation to nature. At its origins, the former is a knowledge specific to the bourgeoisie as a historical class. At its meridian an institutionally separate technology is the crucial, decisive means on the basis of which capitalism develops and which in social practice of daily life immediately and directly connects the former, science, to capital.

So what characterizes capitalist technology? The response is threefold: It is de-organ-ization; the constitution and continuous rationalization of separate spheres of society (resting, above all, on formation of a distinct sphere of production, an economy) each governed by their own norms requiring specific behaviors; and the incarnation of capitalist imperatives in the machines, processes and procedures constitutes specific technologies. We re-emphasize those imperatives can, above all, be summarized in a single phrase: The domination of nature in the service of endless expansion of productive forces.

The technological embodiment of social imperatives, and the immanent relation of science and technology (techno-science) to capital, indicate modern capitalist technology possesses only a *sham* independence. Yet the appearance of autonomous technology is an objectively necessary illusion: The development of *autonomous* technology so-called is at the mechanical, dead heart of the process of capital's *autonomization* and with it the transformation of the bourgeoisie, which, regardless of beliefs and convictions, has come to behave in all significant social events and historical developments as a collection of capitals that are personifications of economic categories. That means the bourgeoisie as a class acting in history is decomposing. And that signifies if technology is actually out of control it is only because the entire system of social relations we call capitalism, its "subject" capital, is truly running amuck. Capital's "daemonic possession" is most visibly in the acceleration of the essential feature of "its" relation to nature, namely, the ongoing, expanding simplification and de-structuring of earthly nature as a whole and its remaking as raw material for production of a world of commodities. The movement of capital is truly "running amuck," lunatic, for it is here and now devolving into a climate change catastrophe.

Yet the romantic critique of technology fails to grasp this: Technology is neither autonomous nor out of control; or, it is both precisely to the extent that capital accumulation is an anti-human process without apparent agency; precisely to the extent that conditions of capitalist production hold sway; precisely to the extent the real subject of society remains capital. Unlike *modern* machine technology, contemporary electronics, or biotechnology unfolding on the basis of societies of capital, there was nothing intrinsic to other past technologies which necessarily rendered them instrumentalist and one-dimensional. No other society in history has had embedded within it a technical ensemble centered strictly on economically "rational" conditions for the material-productive reproduction of society. Moreover, unlike the capitalist world in which modern machine technology has developed, the social practice of daily life in societies of the precapitalist past did not give rise to a specific, separate and allegedly autonomous sphere of technology and its achievements. Precapitalist cultures taken together demonstrate the reality of concrete technologies vis-à-vis nature, cultures in which sensuous nature is inhabited, in which nature

⁴³⁸Ernst Bloch, *The Principle of Hope, II*. Cambridge (MA), 1986 (1959): 661-662.

yields itself up to society's needs without the violence inherent in modern, capital's, technology.

Today, mediated, driven and encompassed by capital (value) accumulation, specifically modern technology is the form that our practical relation to nature takes, and as such is deeply implicated in the dynamics of nature domination that has resulted in "anthropogenic" climate change that, really and as fact (i.e., at this moment at least), is actually generated and encompassed by the movement of capital.

Techné, II

Capitalist Technology and Technologies of Capital

The deepest, underlying unity of modern science of nature and (seemingly) autonomous technology is that unity formed at the level of the basic structure of the civilization that both are central to, namely, the logic of capital.

In this regard, two points are germane. First, in seeking to uncover and explicate the relation of physical science to modern technology, we are not concerned with this or that technique, instruments or machine or machine-complex embedded in this or that production process; rather, we are concerned with the comprehensive meaning and significance of this technology with a view to the role it plays in the entire spectrum of social relations that are at the heart of a specific human, historical-cultural form of life, as one of the ways (today, the dominant way) we comprehend and explain to ourselves our place and role in the world. Second, at the risk of being unduly repetitive it is necessary to stress that *every* culture in the sense of this determination has its characteristic ensemble of technics, its technology: Thus, unlike instrumental-utilitarian mechanical, digital or biogenetic technology all of which have unfolded on the basis of societies of capital, no past technology in the history of humanity was detached from the practico-moral structure of daily community life, none aimed at augmentation of estranged, objectified and reified realities, none incarnated a means-ends economic rationality, etc. Communities and societies of the precapitalist past did not know a separate, autonomous sphere of technology. Whatever its possibilities of realization, a free society would not either...

Technology, because it mediates our relation to nature, does not exist in relation to itself (or solely to humans) but itself is a relation to nature. Modern technology *challenges* nature. Challenging nature is a setting upon an object (nature): This is a belligerency that presupposes and requires a specific type of humanity and society (i.e., aggressive, competitive egoistic individuality that arises out of daily life in societies of capital across the entire epoch of real domination); and, it is a belligerency that not merely transforms nature, but plies natural objects open, reconstitutes them through industrial processes, *lays waste to all "externalities" involved in this anti-human process of unhumanly anti-natural construction, and reduces said natural objects to component forms in which they reappear as raw materials: Surrounding nature in its humanly shaped naturalness disappears as such, and reappears as raw material or "matter,"* that is, it is transformed and prepared to function as elements to be fashioned in, as components of, commodity production in the world of capital. In setting upon nature, modern technology demands it provide the "energy" that is concealed within it, and that this energy be unlocked, extracted, transformed, stored up and eventually distributed (i.e., marketed): In reappearing as "matter," nature is at once "energy," literally, oil, electricity, or nuclear power that functions as a decisive commodity in capital's reproduction.⁴³⁹

This whole process constitutes a transformation, it is not a practice, in which habitat, ecological niches and entire ecosystems are destroyed, and species are extinguished: Product of its movement, the challenging and setting upon nature that is capital's technology is an objectively alien, unhumanly anti-natural societal process that wrests from nature its otherness, obliterating, its objective substance (i.e., its autonomy, self-ordering and self-mediating cohesion, all, at any rate, denied to it by science). Stated more prosaically, capital's technology robs earthly nature of, destroying, its internal diversity, in particular its biological diversity: It homogenizes distinctive landscapes and creates in their place agricultural, forestry and urban (metropolitan) monocultures, transforming natural settings and once humanly formed

⁴³⁹This is authentic insight and we largely owe it to Heidegger's "The Question Concerning Technology" (1955) in Martin Heidegger, *The Question Concerning Technology and Other Essays*, edited and translated by William Lovitt. New York, 1977: 15-19. Heidegger's critique is not entirely romantic, for he notes that all work "today is commanded by profit making" ("Ibid," 18) ... crude but correct.

There is too much genuine insight in Heidegger to simply ignore him (or, dismissing him, to argue as one acquaintance has, "what is valid in Nietzsche and Heidegger is in Marx, and what is not in Marx is not valid"). Instead, what is genuine and valuable in Heidegger must be assimilated and in the comprehensive sense rationally reconstructed: Here, what is at issue in the so-called question of technology is a matter of extracting those insights and systematically relating them to their context and those historical practices that generate(d) it (technology), relating it to the value-form and capitalist production in its historical specificity.

landscapes and prepares what can be extracted from them as matter or stuff for production in the world of capital. (Oil, coal and lumber are such components, raw materials. The polluted seas, stripped mined Earth and ravaged forests are all "externalities" ... The most basic component is energy as such. That exalted pinnacle of the new physics in its relativist formulation, the equation, $E = mc^2$, perfectly summaries this whole movement, the essential feature of the relation described here.)

Everywhere nature, natural objects and beings, now ripped open, reduced and so transformed, are commanded to be ready or immediately to hand. They are commanded and arranged, that is, produced and ordered, to stand by, to be merely present for further, future production and ordering, for the sake of achieving a maximum yield with a minimal expenditure: The meaning, significance and real being of nature is, to one side, wantonly destroyed residue, "externalities," to the other, "matter" that is merely ready to hand or inventoried as unrefined material resources for commodity production. Phenomenally speaking, the entire societal practice is determined by the pursuit of profitability: The human-social logic that essentially governs modern technology, its import, function and development, is the logic of capital accumulation.

So the romantic critique of technology not only fails to grasp that technology is neither autonomous nor out of control (or is so long as that demon, an anti-human process without apparent agency, capital, holds sway), it also fails miserably to understand that curtailing the baneful human inputs producing climate warming is not a question of less technology or, for that matter, of more technology. Every human society in history has negotiated its relation to nature of which it is part through an ensemble of technics, a technology, it produces and masters. The question is how practically do we envision our relation to nature: It should be clear here that it is not "man"... humans are a part of nature, in nature, are nature, are humanly natural... who is somehow an "intruder" in nature: The intruder, as it were, is the subject of that anti-human process without apparent agency, capital...

If we consider physical science and modern technology with a view to the manner in which each "relates" to nature, we note a decisive homology. Science projects nature as calculable assemblage of bodies in motion, a projection that permits prediction and control and implies the possibility of actual domination. Modern technology challenges nature and sets upon it in order to open it up, reduce or change it in its sensible form, and store this distillation or product. In so doing, modern technology, no longer engaged in mere mastery, realizes the domination implicit in physical science... the crux of this relation is the experiment, especially on the vastly expanded social basis on which it is conducted today... In both cases, sensuous nature has disappeared.

Part IV

Remarks on the Reconstruction of the Geological Past

Life improves the capacity of the environment to sustain life... Life makes needed nutrients more readily available. It binds more energy into system through tremendous chemical interplay from organism to organism.

Leit, in the deep desert of Frank Herbert's *Dune*

Before we conclude this discussion, it is necessary to describe some of the less well-known issues involved in climate change that, in revealing the depth geological character of the crisis in nature and society, will leave us with a far clearer, and perhaps lasting sense of the simply enormous stakes involved in the destruction emanating from capital.

The Geophysics of the Earth, VI

Three Reasons Why We Might Suspect Life Occupies a Special Place in the System of Natural Relations We Call the Earth

Within societies of capital, the culturally hegemonic form of knowledge, understanding and practice vis-à-vis surrounding earthly nature is guided by bourgeois theory. For it, nature is essentially dead, inert matter, shapeless extension and, in our terms, forms a raw material basin for the production of a world of commodities on a capitalist basis.

Is it possible within the framework of science to consider the Earth otherwise, namely, as an evolving totality of physical, chemical and biological relations, events and processes, a self-regulating system of relations in which life itself plays a central role, and, more radically (and less acceptably), which aims at habitability? We can offer this much. You decide.⁴⁴⁰

⁴⁴⁰Our own assessment can be found in the Afterword, *Earth Systems Science: A Brief Critique of Premises, Method and Content in the Contemporary Science of Nature (Earthly Nature)*, above.

First, starting from a critically apprehended, scientific reconstruction of Earth's existence over eons (billions of years), we can note that the average temperature of Earth's surface has remained more or less stable over nearly four billion years, while, in fact, given the sun's increasing luminosity over the same period, about 35%, that temperature should have risen a like amount. It has, though, remained within a range of 10°C to 20°C without ever reaching a boiling or a freezing point. Whether the Earth has undergone glaciation or tropical extremes, it has never become an unfit place for life.⁴⁴¹ If the Earth were a dead planet like Mars or Venus, without oceans, atmosphere and without life, this would not be possible. Unanswerable within the framework of physics (for such, it is not possible), we might be led to the view that life, the biota as a whole as it exists at the surface (land, lower atmosphere and oceans) plays a decisive role in the regulation of planetary temperature (i.e., the average global surface temperature).

Second, a chemical analysis of the composition of the gases making up the Earth's atmosphere demonstrates that it is entirely anomalous with regard to what equilibrium chemistry would otherwise demand. In an equilibrium world (essentially a dead one), the atmosphere would consist in 99% carbon dioxide, 0% nitrogen, 0% oxygen and 1% argon. Thus, the atmosphere of Venus is made of 98% carbon dioxide, 1.9% nitrogen, trace amounts of oxygen and .1% argon; that of Mars, 95% carbon dioxide, 2.7% nitrogen, .13% oxygen and 2% argon. The surface temperature of Venus is 477° C, that of Mars -53° C. The Earth, on the other hand, has the following atmospheric content: .03% carbon dioxide, 79% nitrogen, just in excess of 20% oxygen and 1% argon. (Without life, that atmosphere would consist in 98% carbon dioxide, 1.9% nitrogen, trace amounts of oxygen and .1% argon.) Its surface temperature is 13° C (55° F), while without life it would be 290° +/- 50° C.⁴⁴² The "anomaly" is enormous, for the extent to which nitrogen is dynamically maintained in disequilibrium is ten orders of magnitude (10^{10}), while that of ammonia and methane are beyond the limits of computation, effectively infinite. Additionally, all these gases (argon, ammonia, methane, nitrous oxide, hydrogen) are burned by oxygen in the atmosphere. To consistently maintain existing atmospheric levels and the unique stability it achieves, these gases must be constantly replenished. How?

The Earth has for an indeterminate period something less than the past two billion years had a roughly

⁴⁴¹As one might expect, contemporary astrophysicists pay a lot of attention to stars. Among other things, these scientists have constructed a sort of phenomenology of the "life" of various stars, an account of the primary types of stars, the dynamics evolving in different phases or stages of typical stars life cycles arranged according to luminosity and temperature (entailing different atomic compositions, masses, and longevities). It centers on "main sequence" stars and, with some exceptions (supergiants, red giants and white dwarfs), it constitutes a classification that encompasses the greatest down to the smallest stars. Our, the Earth's, sun is a class G star, which makes it a moderate sized star or, more precisely, puts it on the lower end of the middle of this classificatory scheme. (It is a G2 where a sub-classification of each category - O, B, A, F, G, K and M - ranges from 9 down to 0, from hotter to cooler.) The surface temperature of our sun is roughly 5800° Kelvin (its internal temperature may be as high as 10^7 ° K), and, as the measure of all other stars, has a solar luminosity of 1. (Now outside the main sequence the giants, for example, have the same temperature as our sun but far greater luminosity, by a factor of one hundred, 10^2 , which makes them far larger.) The overall life of our sun is roughly ten billion years. Currently it is about half that age.

Stars do not, on this view, burn evenly throughout the course of their life cycle. This includes our sun. The sun burns hydrogen and, in burning it, it fuses hydrogen atoms into helium ones (fusing two single proton atoms into a single atom with two protons). Gradually, that is, over billions of years, the hydrogen at the star's core gets converted to helium, to the point at which the star's helium core is roughly 10% of its mass. But at this point the temperature within the star is not hot enough to fuse helium atoms. (It takes far more energy to force four identically charged protons together than just two.) Because there are no nuclear reactions at the helium core, and since the surrounding hydrogen envelope is nonetheless not as hot as that core, the core leaks radiation (protons) into its envelope. The core contracts as a result of this leakage, and subsequently the pressure of the contraction causes it to heat up. Helium atoms begin to fuse... The hydrogen immediately surrounding the core forms a shell around it and, in fusing, increases the mass of the helium core which continues to fuse but not enough to prevent continued contraction: As a result of the increased interactions in the central region of the star, the core now emits more radiation: It has become more powerful, more luminous. "Deposited," as it were, in the outer envelope, the extra radiation emitted from the core pushes this envelope outward. Thus, the star expands (to a red giant). The core continues to contract, heating up more, perhaps fusing helium atoms into unstable beryllium (heating up eventually to as much as 10^8 ° K). Toward the end of this cycle, perhaps about 4 billion years from now, the sun's diameter will expand to encompass the orbits traced out by Mercury and Venus, and then Earth, which will be incinerated. If you accept this, then long before current estimates suggest about two billion years from now, the growing intensity of the sun as it burns will evaporate the oceans.

At this moment, cosmologically speaking, the system of relations we call earthly nature is already under tremendous stress from increasing solar insolation, for it has risen about 33-37% since the origins of the Earth. We shall come back to this.

⁴⁴²Lovelock, *Gaia: A New Look at Life on Earth*, 39.

20% plus oxygen atmosphere. An atmosphere at greater than a 21% oxygen composition would result in spontaneously combusting wildfires at Earth's surface (at 25% atmospheric oxygen content even the damp leaves of the rainforests would burst into flames);⁴⁴³ below that level, the diversity of life as we know it, and have known if for at least the past 540 million years, could not exist. At the same time, equilibrium chemistry tells us an atmosphere with a 20% plus oxygen content should not be able to co-exist with the other major, a highly reactive gas, nitrogen, and minor ones as well, methane, ammonia and carbon dioxide. This is not a question of degree, for these other gases (gases other than oxygen) exist in Earth's atmosphere at several orders of magnitude of what they might be otherwise expected. For example, methane and nitrogen are explosively reactive; oxygen and nitrogen at these levels could be expected to react and form large amounts of nitrogen oxides that are poisonous. They don't. Now chemical disequilibrium of this enormity is not merely "anomalous": It has existed in this form for at least 1.5 billion years, and it could have existed in this form only if it has been *actively maintained... by life*, by bacteria alone (for the first billion of those years), and by bacteria, plants and animals (for last half billion of those years)... on the basis of the constant circulation of those gases through, for example, respiration (e.g., carbon dioxide intake) and the emission of gaseous byproducts of that waste (e.g., oxygen). *Earth's atmosphere is not physically given, but is constructed, i.e., its composition is generated and sustained, by life as a whole.*

Third, plant life plays a major role in accelerating the otherwise strictly chemical process of weathering, and thereby enters into and shapes the carbon cycle over geological time.

Limestone is formed by mixing calcium (Ca_2) with bicarbonate ions (minimally two, 2HCO_3), which chemically gives us limestone, CaCO_3 , and carbonic acid, H_2CO_3 . Silicate weathering, on the other hand, occurs as rock silicates, CaSiO_3 , combine with carbonic acid (here, again, minimally two molecules), $2\text{H}_2\text{CO}_3$ and, in so doing, produce two bicarbonate ions (2HCO_3), silicate dioxide (SiO_2) and water (H_2O). As the relation between surface Earth rock silicates exposed to air and water (precipitation) and the end product of the process, limestone, weathering is given in the equation, $\text{CaSiO}_3 + \text{CO}_2 \rightarrow \text{CaCO}_3 + \text{SiO}_2$ (where the arrow, \rightarrow , indicates what is formed following chemical reaction).

Thus, rock weathering as described here chemically releases inorganic carbon from silicate and carbonate rocks (e.g., quartz, granite). The breakdown products run off. They are carried by waterways out to sea. They eventually accumulate in the form of limestone which is sequestered at the ocean bottoms (and which subducted, as one lithosphere ocean plate moves under another or under a continental plate, will eventually pass to the asthenosphere from which it can reenter the carbon cycle as carbon dioxide by way of volcanic eruption).

Of special import here is the impingement of, integration with and growing determination by plant life on weathering, transforming "physical reactions" into a distinctively and inseparably biologically formed chemical processes: The "invasion" of the land by plants over the past 500 million years has dramatically transformed weathering rates, hence the cycle of CO_2 among land, air and sea.⁴⁴⁴ How so? Plants break up rock as they root in the soil seeking out nutrition: Rootlets, including symbiotic bacteria and fungi they hold, exude different organic acids across their surface area that effectively detach substrata minerals, nitrates, phosphates and other elements requisite for growth. Additionally, plant root systems vastly increase the water retention of soils, setting up a barrier against erosion, thereby establishing a minerals encompassing liquid environment that increases the rate of mineral and mineral material dissolution. These biologically generated processes accelerate rock weathering.

If life shapes the "basic" physical-chemical processes that shape it, then their relation, *the causation so called*, is dialectically circular, not linear and not amendable to reductionist treatment. In the case of weathering, plant life as part of earthly nature functionally has for thousands of millennia engaged in maintaining habitability in the face of increasing solar insolation by entering further into the carbon cycle (beyond merely giving off oxygen by metabolizing carbon dioxide which itself draws down a greenhouse gas that would otherwise increase atmospheric heating), detaching carbon from its mineral substrate and permitting it to be sequestered. In this respect, plant life has been engaged in what appears as a rearguard action of the biota as a whole, which in its entirety regulates climate (temperature) to sustain that habitability.

⁴⁴³ *Ibid.*, 71.

⁴⁴⁴ Peter Ward, *The Medea Hypothesis: It Life on Earth Ultimately Destructive?* Princeton (NJ), 2009: 63.

The Geophisiology of the Earth, VII
The Uniqueness of Earthly Nature

An offworld community is a dream of a disenchanted, existentially dissatisfied world; not just for a new start, but as a failure to break with the civilization of capital, engrossment in its spectacle and its repressive desublimations, a dream of having one's cake and eating it too. The matrix, a nightmare turned upside down dreamt by zombies.

The Earth may be unique in the universe; it surely is in the small portion we have come to understand. Yet confronting the rapacious plunder of nature and its cumulative consequences, there are those who believe we might escape, as it were, off-Earth, find a new planet in which the same shit can be begun anew.

One here, for example, thinks of the Sigourney Weaver film, *Aliens*, with its deep space planet being made habitable by mechanical-technological production of a breathable atmosphere, when in point of fact scientifically knowledgeable organic intellectuals of capital, among others NASA scientists, fully recognize that said production is not, even in principle, a technical achievement: Before any "terraforming" is possible, an uninhabited planet must, unlike for example Mars, have a strong enough magnetic field to deflect solar winds to prevent ablation (removal of all water vapor and other gases forming the atmosphere). Then its surface must be inundated by a massive, viable living presence, such as planetary ubiquitous bacteria.. It was just such a presence that created Earth's oxygen atmosphere as a waste product of its metabolic activity. But that presence presupposes a functioning hydrosphere and *repetition of the evolutionary microbial colonization activity* that occurred on Earth and created a breathable (oxygen) atmosphere. It might be noted, these earthly features are the outcome of roughly two billion years of geophysiological interaction between early life and inorganic nature. Furthermore, our nitrogen-oxygen (i.e., breathable) atmosphere began from an already existing atmospheric presence of gaseous hydrogen, ammonia and methane, sulfides, formaldehyde, and so on. That is, this too is a cosmological-geological premise for a habitable planet. Even *if* all these gases were in place at once, generating a livable planet would take, even *if* that evolutionary colonization was compressed by several orders of magnitude, *thousands of years*, and then only base camps or colonies entirely dependent on Earth for food and supplies could be established.⁴⁴⁵

There is, however, no anatomical-physiological evidence to support the belief that human beings can reproduce themselves as enduring demographic groupings anywhere else than on Earth where the most minimal requirements, *socially mediated*, are not satisfied. (A sustainable population is opposed, for

⁴⁴⁵The same situation can be and has been examined literarily:

"But, you know, I bet they're all like this one. I mean, they're either going to be alive or dead, right? If they've got water and orbit in the habitable zone, they'll be alive. Alive and poisonous. I don't know. Maybe they could be alive and we live with them and the two systems pass each other by. But that doesn't sound like life, does it? Living things eat. They have immune systems. So that's going to be a problem, most of the time anyway. Invasive biology. Then on the dead worlds, those'll be dry, and too cold, or too hot. So they'll be useless unless they have water, and if they have water they'll probably be alive. I know some probes have suggested otherwise, like here. But probes never stop and test thoroughly. They might just as well be running their tests on Earth, if you think about it. Bugs like these we've got here, you aren't going to find those unless you slow down and hunt really hard. Live nearby and for a while and look. At which point it's too late, if you get a bad result. You're out of luck then.

"...What's funny is anyone thinking it would work in the first place. I mean it's obvious any new place is going to be either alive or dead. If it's alive it's going to be poisonous, if it's dead you're going to have to work it up from scratch. I suppose that could work, but it might take about as long as it took Earth. Even if you've got the right bugs, even if you put machines to work, it would take thousands of years. so what's the point? Why do it all? Why not be content with what you've got? Who were they, that they were so discontent? Who the fuck were they?

"...Maybe that's why we've never heard a peep from anywhere. It's not just that the universe is too big. Which it is. That's the main reason. But then also, life is a planetary thing. It begins on a planet and is part of that planet. It's something that water planets do, maybe. But it develops to live where it is. So it can only live there, because it evolved to live there. That it's home. So, you know, Fermi's paradox has its answer, which is this: by the time life gets smart enough to leave its planet, it's too smart to want to go. Because it knows it won't work. So it stays home. It enjoys its home. And why wouldn't you? It doesn't even bother to try to contact anyone else. Why would you? You'll never hear back. So that's my answer to the paradox. You can call it Euan's Answer

"...So, of course, every once in a while some particularly stupid form of life will try to break out and move away from its home star. I'm sure it happens. I mean, here we are. We did it ourselves. But it doesn't work, and the life left living learns the lesson, and stops trying such a stupid thing."

A member of the spaceship Aurora's crew, Euan, who on an off-Earth habitable planet finds himself under attack by microbial life forms native to the planet, parasitically infected and dying (his fellow colonists all already dead) in Kim Stanley Robinson's *Aurora*. New York, 2015.

example, to another world colony dependent upon the larger populations of Earth *and* Earth-based resources.). The evidence indicates the opposite (and what to the contrary counts as "evidence" for technologically rendering a hostile planet habitable is *completely obfuscatory, exclusively* filmic and novelistic science *fiction*). There is simply no grounds for believing that such a colony might someday be able to deploy an advanced technology currently beyond us in order to overcome these requirements: Demographically humanity cannot reproduce *itself* without sufficient water; without a nitrogen-oxygen atmosphere for the ease with which we, humans, respire, an atmosphere that at the same time is "thick" enough to burn up common space debris (including smaller meteors) during entry and large enough to insure that it is not destroyed by large meteors or small planetoids; and, without a planet "sized" to a single gravity environment (i.e., humanity evolved and is anatomically and physiologically "fitted" ...for the ease with which we move about ...to a planet with the celestial mass of Earth)... In all these respects, it is biologically diverse life that in its constant movement purifies and provides clean water and the very air we breathe, that renews soils from which we grow the foods we consume, and that in death and decomposition provides the geologically compressed forms for fuels we burn to regulate temperature within the structures constituting our built environment.

Earth is in the right location in our galaxy ...Most stars in galaxies are close to the center, but at the center stars and their orbiting planets are subject to innumerable (not thousands or millions, but over the life of the planet, trillions) of comet passes causing very high rates of bombardment. Moreover, intense radiation and frequent explosions of large stars prevent the existence of life near galactic centers. Further, at the edges of galaxies, the nature of star light suggests that star systems are starved for metals (very low levels of silicon, iron, magnesium) and all the other requirements for planets and the building blocks of life.

Our sun is just the right size... The "life" of large stars is too short for intelligent life to have developed. Further, they emit too much ultraviolet radiation. The habitable zone for our sun is about .95 to 1.15 times the distance of the Earth to the sun. For smaller planets that habitable zone is far closer to a sun type star because these planets (assuming they are not dead rocks) internally generate only low levels of energy (far lower than Earth). However, planets close to a sun risk the danger of solar flares. They, moreover, also tend to be tidally locked: One side always faces the sun and burns, while the other always faces away and freezes.

Jupiter is just the right kind of gigantic shadow planet... It prevents Earth from getting bombarded by probably 1,000 times the number of comets and meteoroids that actually hit it, instead throwing them out into space. If Jupiter's orbit were more elliptical, just ever so much, or if it were any larger, it would have the opposite effect and gravitationally destabilize Earth's orbit and the asteroid belt. And, it might be noted, that all of the Jupiter-sized planets that have been observed so far in other solar systems have very eccentric orbits.

And the Earth's moon is both the right size and at just the right distance from Earth... The moon behaves like a gyroscope: It minimizes the changes in the tilt of Earth's axis and steadies that tilt. What is the importance of this? First, it renders Milankovitch cycles small enough to maintain a relatively stable climate, and, second, it provides us with seasons. (Climatic variability producing seasonal and distinctive flora affects the geographical distribution of species, species isolation, and even on modified Darwinian assumptions is a crucial element in the evolution of life on the Earth.) Furthermore, the moon's formation has provided the Earth a fast rotation rate that keeps day and night temperature swings from being too great.

Finally, *the Earth's nearly circular orbit keeps it at just the right distance from the sun* to maintain liquid water, a premise of life as it has evolved.

To boot, there is no astrophysical evidence that within the lifetime of a single individual (even if today's average life span was doubled) that an off-Earth setting, a planet if not immediately habitable then not unalterably hostile, is within reach, within several light year travel. On relativistic assumptions, it might be recalled, that the mass of objects approaches infinity as the velocity of the object approaches light speed, that is, travel at light speeds is not possible (i.e., anti-gravitational drives, warp drives, etc., and their capacities for "jumps" to light speed are all fictional fantasies).

Those who, in the face of species extinction, climate change and the ongoing, mounting despoliation of Earth *by capital*, advocate abandoning Earth live in a dream, a fantasy fed by capital's critical sensibilities-dulling, visual media spectacle...

The very possibility that humanity is not restricted to Earth-based resources rests on the assumption that man is an unlimited being, that is, infinitely productive and the world (totality, the universe) is constructed

to support this behavior. This, the latter clause is entirely consistent with the assimilation of humanity to capital, that is, capital does, in fact, present itself as an infinite entropic process of nature conquest that can be sustained *only if nature in its practical infinity is immediately accessible as a raw material hold and a sink* to absorb its waste.

From Plato and Aristotle through Augustine and Aquinas down to Spinoza and Hegel, an infinitely productive being is conceived as eternal substance. The moment of truth in this conception is that *natura naturans* (naturing nature, an infinitely productive being) is not possible if it is not without beginning and end (i.e., a necessary feature of infinity is endless becoming). Man, however, is mortal and finite. She is mortal and finite because she is sensuous, embodied. The transformation that she effects starts from this incarnate existence, always involving bodily engagement, tools, instrumental complexes, technologies that also are sensuous-material in order to work, labor, act in historical time on the sensuous-material Earth, to appropriate or rework, even renew, its resources. Our own sensuous-corporeal relation to earthly nature always mediates our relation to the universe. In other words, *in social practice infinite being is not immediately given but only mediated through our relation to the Earth*, to earthly nature in its aspect as *natura naturata*, as limited nature (or being). It is for this reason that in historical time, lacking a conscious agent that practically abolishes capital, the infinite entropic process of nature conquest must and can only proceed by way of the plunder, despoliation and geologically temporal de-structurization of the Earth, recreating it as a basin of unprocessed materials at the beginning of commodity production and a toxic wasteland as a cycle is completed with commodity consumption, and it can only proceed by way of mass species extinctions and climate change as further necessary outcomes.

To argue otherwise (i.e., to assert that the movement of capital can transpire, unmediated, in the order of the universe) is to absurdly presuppose that this movement need not be borne by man as a sensuously practical being *and* need not proceed by way of despoliation of the Earth; it is also to assume that the latter is merely an "empirically" contingent development. This is to argue within the cognitive framework for which theory is logically opposed to "empirical" analysis, i.e., it need not rise from history. This opposition moves within the orbit of science, hence capital: Critical, self-reflexive theoretical analysis on human experience does not generate the opposition of theoretical to empirical analysis. This is science, and it is bourgeois; it is analysis generated on the basis of abstraction without concretion. Rising from social and historical contents, theory instead develops the category of objective possibility, because *although historical development, itself neither fully necessary nor entirely contingent, moves in a singular direction, it is always latent with possibilities.*

The Geophysiology of the Earth, VIII Origins of Life, Ancestral Bacteria, Biological Diversity

Earthly nature is formed as a multi-layered and multi-ordered, interconnected whole of relations, processes and substances that in their interactions integrate the atmosphere in its thermal structure (troposphere, stratosphere, mesosphere); oceans (warmer surface waters, cold, nutrient rich deep waters); and land masses with their specific features, extending downward to several kilometers of crust that are effectively compressed, dead, past or bygone biospheres, and include massive plates movements which are responsible for shifts in continental land masses, the silicate mantle, and the outer liquid iron core from which arises the magma that erupts in volcanoes and creates the uplift responsible for plate tectonic activity; and, the internal solid iron core (magnet mass), the shape, mass and the uneven, off-center distribution of which has created planetary wobble, hence determines orbital precession.

But what is really important is why we refer to these processes and relations taken altogether as *geophysiological* as opposed to geophysical: It is not because the Earth is alive (as if it were some super organism) but because of the determinate role of life (the biota in its entirety) in its evolution.

To grasp this, to really get a sense of the force, reality and significance of climate change we must reach all the way back to the origins of earthly life itself with a view to what is distinctive and characteristic about it. Start with a well-established datum we have reconstructed: An oxygen atmosphere as we know it today, in fact, an atmosphere that would support the complex, variegated life we take for granted, did not exist for at least the first 2.5 billion years of Earth's geophysiological history.

Since 1953 (the Miller-Urey experiment), we have known that in the presence of sunlight common molecular gases (methane, CH₄; ammonia, NH₃; molecular hydrogen, H₂; and water vapor) found in a primitive planetary atmosphere can be synthesized by electrification, that is, by lightning strikes: Organic compounds will form, including amino acids (which, when molecularly bonded in long chains, form

proteins). Organic compounds are the basic "components" of life... Now the early Earth atmosphere, chemically, may not have been primarily ammonia, methane, hydrogen, one that was concentrated and highly reactive. It may have been far more dilute and much less reactive (as geological evidence suggests), for example, predominately nitrogen and carbon dioxide based. To boot, macromolecules do not do well in highly energized environments (lightning, ultraviolet radiation) which ionize molecules, breaking down molecular bonds. At life's origins, there need only have been sufficient carbon, water and energy present and there were many early Earth environments (e.g., at hydrothermal vents on the oceans' floors) which chemically possessed these features... At any rate, it is, of course, a long way from simple organic compounds to the complex arrangement that constitutes a living organism even in its most original, archaic form... Shake oil with water and bubbles form, bubbles with insides separated from outsides. Something on this order occurred: In its most elementary form, when life on Earth first emerged some 3.8 billion years ago it consisted minimally in a cellular membrane, a greasy little lipid bag containing phosphates and nucleotides that, in metabolism, in a continuous chemical exchange of an inside with an outside, grew increasingly complex and capable of self-maintenance and, eventually with real consistency, self-reproduction... This was the ancestral bacterium, and its origins was not an event that happened just once, but occurred simultaneously and sequentially countless times over in different earthly environments... Energy would have been provided by sunlight, but what was important for this increasing complexity is *synthesis* (including the molecular syntheses of sugars, ATP, and proteins, even if unregulated): It is synthesis that defines life at all levels and orders from the most elementary to the most complex. In the Achaean prokaryote cell, defined as non-nucleated, anaerobic cellular life (as non-oxygen respiring bacteria, or archaea) that first identifiably appeared as life on Earth, this synthesis *is* metabolism (in its specific bacterial form), as the continuous transformation of inorganic molecules into organic ones within the cell itself and the elimination of molecular wastes expelled from the cell.

In reconstructing early Earth's atmosphere, we would note that the early atmosphere was not only not oxygen-based, but likely rich in hydrogen (H_2) and hydrates, say, hydrogen cyanide (HCN), ammonia (NH_3) and methane (CH_4). Over the course of an eon (about 2.5-1.5 billion years ago) cyanobacteria, blue green algae which are simultaneously anaerobic and aerobic, in the metabolic synthesis of inorganic molecules created the oxygen atmosphere as a waste product of that metabolism, an atmosphere that characterizes the world today and, because oxygen respiration is an essential necessity of life, is (with the exception of anaerobic prokaryotes) the foundation all life since. As much as 1.5 billion years old, that atmosphere is maintained today, as it has been over the past 400 million years, by synthesis, first and foremost by bacteria, blue-green algae and phytoplankton, above all phytoplankton, and then by the photosynthetic activity of plants (together with the same bacteria) in which carbon dioxide together with water and sunlight is molecularly transformed in plant metabolism producing oxygen, O_2 as a waste product. This metabolic process (production of oxygen) forms a decisive moment of the carbon cycle, and is integrated with other cycles (nitrogen, sulfur, etc.) that incessantly involve the bacterial transformation of inorganic into organic substances and vice versa in gaseous, solid and liquid forms and settings. Plants die, decompose through the work of bacteria, forming organic sediment, a land surface, which is compressed and compacted further forming layer upon layer of the upper layers of the Earth's crust, effectively the landed aspect of bygone biospheres, that reappears and, today, is utilized in synthetic human activity as hydrocarbon fossil fuel (coal, petroleum). Living symbiotically and interacting with trees roots, bacteria "fix" nitrogen (synthesize it in organic form) from the soil and bring mineral salts to these plants. Animals (in the taxonomic sense) produce methane as gaseous metabolic waste, and carbon dioxide in respiring, both atmospheric gases. Animals, mammals in the narrow sense, specifically cattle, horses, dogs, rats and mice, carry not fully digested plant debris in their guts, and, wherever they wander or travel in large groups (with humans), excrete these remnants as waste, which in turn seed soils and that in some cases in the historical past have transformed the entire flora of continents, not merely remaking visible landscape but transforming the nature and character of vegetatively biotic activity. Such was the case in New Zealand and the Americas in the centuries following the "conquest." Life is in continuous interchange with itself and with biologically mediated inorganic nature, as one of life's form's wastes is nutrients for others.

All life, not just humanity in forming socio-historical worlds, is ceaseless activity engaged in synthesis that makes and remakes surrounding nature of which it itself is part and in which it is formed. Once life appears, it engages in remaking its own inorganic conditions, which as such disappear. Life incessantly remakes those conditions that are themselves the product over thousands of millennia of the interaction of organic with inorganic earthly nature...

With the partial exception of the most intensely tropic regions, visible nature did not appear the same 15,000 years ago as it does today, or as it did 250 years ago at the outset of capitalist development; it did not appear the same 150,000 years ago as it was 15,000 years ago; 1,500,000 years ago it did not appear the same as it did 150,000 years ago; and, 15,000,000 years ago it did not appear the same as it did 1,500,000 years ago. In the early Cretaceous, just less than 150,000,000 years ago, the Earth was a mild "ice house" planet with snow and ice during the winter seasons and cool temperate forests covering the polar regions; the continents did not exist in their present locales and did not even exist in their current shapes (e.g., Africa and South America had only begun to separate and only near the equator), the Pacific Ocean was perhaps three times its present size, and the Atlantic Ocean had not really begun to open yet, effectively it did not exist. (Just in excess of fifty million years earlier, a single continent, Pangaea, formed Earth's only landmass and it was very arid and hot as deserts covered the tropics of today's Amazon and Congo rainforests.) The primordial contours of Earth cannot be geologically and topologically reconstructed: when measured in geological terms, the face of the Earth has undergone incessant change. There is no Earthly paradise, an Eden, to return to...

From its very origins, life is primarily and fundamentally *autopoiesis*, meaning, first, life literally makes itself and meaning, second, that life is independent, but an independence that is only formed on the basis of prior dependency. The very nature that is perceptually given in human experience is the outcome of thousands of millennia of non-Darwinian co-evolution, of mutual penetration, shaping and transformation, of life in its riotously diverse forms with what is abstractly characterized as inorganic nature: The geological and tectonic processes (uplift, subduction and plate spreading, volcanism) that form mountains, oceans and atmosphere are all mediated... controlling the pace of occurrence, transformed or literally created... by life... through plant accelerated weathering of rock, the deposition of sediments, by bacteriological metabolic production of gases and maintenance of temperature and oceanic alkalinity. Unlike the other terrestrial planets in the solar systems (Mars and Venus) that are dead rocks, there are no purely geological processes on Earth... For the matter, there are no other planets in the known universe like Earth...

While bacterial communities are essential, and while for over three billion years of life on Earth bacteria (not humans) must be accorded primacy, it is not any specific form of life that shapes the geology of the Earth; rather, it is multiple, complex and differentiated life in its entirety that does: It is biological *diversity* that is crucial. For that diversity is at once the heart of the biosphere and its, life's, own central presupposition as viable, self-sustaining life, and in this regard, it is the presupposition of specifically human life...

Beyond the meaning, the *significance* of the autonomy, cohesion and otherness of earthly nature can be formulated thusly:

If the various, multiple life forms that are resident to Earth were simply subject to Malthusian, Darwinian and Mendelian determination; if a struggle for existence was essentially characteristic of life on Earth; if integration, interaction, and symbiosis in both its narrow, technical and broad, loose senses were not decisive; then, ineluctably subject to cosmological perturbations and seemingly mere geological upheavals that were consequent largely of its own interactions, life on Earth would long ago have disappeared. Instead, it is precisely the interaction and integration of millions of different species and billions, perhaps trillions, of organisms which maintain a necessary plasticity, "flexibility" and responsiveness, even "excess" which functionally and interactively sustains the biosphere as self-regulatory as it confronts cosmological and seemingly purely geological disturbance. Biodiversity maintains, nourishes and preserves the biosphere, nay, earthly nature itself. It mediately coheres this nature itself because the greater the forms of life and species on Earth, the greater the interaction with the inorganic world, the more nutrients available to life in any and all of its aspects, the greater the interplay and integration and mutual interdependence of these forms of life, the more chemical energy is bound up in the biosphere through that interplay and interaction, the tighter it is held together as a system of organic relations, the more balanced, robust and resistant is earthly nature as a whole, the more resilient it is to disruption, destabilization, assault (including disease) on any of its aspects, on any specific life forms or groups of them. It is this diversity and redundancy that capital, even if only geologically temporarily, is wrecking. So, it is the geophysiological and specifically vital foundations of humanity that capital, our own estranged power run amuck, is destroying.

It is not just that life as a whole reaches into the Earth's central dynamics, as it shapes them as they form it. Life on Earth reaches back to the most primordial conditions in nature to actively mediate its own *cosmological* presuppositions: In contemporary astrophysical theorizations, the sun is a class G star with

an anticipated life of perhaps 10 billion years. Having reached roughly the halfway point of its existence, it burns far brighter than it did when the Earth first formed some 4.5 billion years ago. Today, its luminosity is 33%, 35% or 37% greater depending on whose calculations are used. *Without qualitative development of the biosphere – especially bacterial and plant life, its increasing complexity and growing integration with the chemical processes of the atmosphere and oceans through respiration and transpiration, and specifically absent temperature modified by life at Earth's surfaces, the necessary and actual condition of which is biologically diverse life - this vastly increased light (solar radiation) would have long ago rendered the Earth unbearably hot, a metabolically intolerable setting for any aerobic (oxygen respiring) beings including human beings, perhaps a living planet but then one fit only for anaerobic bacteria (one characterized by Canfield oceans and an atmosphere suffused with hydrogen sulfide), or perhaps a dead rock like Mars or Venus.*

The Situation Today (March 2018)

As the police despotic, increasingly totalitarian naked dictatorships of capital over the societies of the world continue to entrench themselves, as, for instance in the United States, the programs of the governing parties of the right are progressively shaped by nativist, racist, xenophobic and, more and more fascistic currents within them... exhibited in forced expulsions (the latest examples being Rohingya in Burma and Salvadorans in the US), financial sanctions (again the Americans censoring Russia, China, Iran, N. Korea), and protectionist tariffs (one more time, the US on steel and aluminum aimed primarily at Canada, Mexico, China and S. Korea)... generate socially generalized anxiety and trepidation and, in some quarters, open fear as the drift toward renewed imperialist world war accelerates.

If this constitutes the real situation, that situation nonetheless remains to be comprehended actually, i.e., immanently the tendential direction of that movement which is society within nature has not been captured and fixed, for there is another crisis which looms just beyond the horizon...

While some form of climate change had been ineluctably part of the near future even before James Hansen first pronounced it a dangerous possibility in front of the US Senate back in 1988, in our view since autumn 2012 abrupt climate change has been irreversibly underway; furthermore, it is not only irreversible, it cannot be mitigated.

At a mass level, this transformation still lays beneath the horizon. Even so, indicators of it are numerous: Global atmospheric carbon dioxide levels hit 410 ppm in May 2017, higher than any time since the mid-Miocene, 15-17 million years ago while real levels, CO_{2e}, at 483 ppm are higher than any time since the early Miocene, 23 million years ago; average global atmospheric methane levels, 1870 ppb, are now as high as those of the end Oligocene – begin Miocene, 25-30 million years ago; a year over year rate of CO₂ increase quickened from early 2015 to early 2016, rising from 3.8 ppb to 4.2 ppb, an unprecedented rate which even the reconstructions of the "Great Dying," the Permian extinction 249 million years ago, do not approach; rain fell on 29 December 2015 above 80° N latitude while the temperature on the same day hit 1° C / 34.6° F at the North Pole instead of the geological norm of -40° C / -40° F. On 5 February 2018, the temperature above 80° north latitude reached 24°F (25°C/45°F above the geological norm), while temperatures at 45° north latitude, 2500-3000 thousand miles south in central North America, were -22° to -24.5° C (-8° to -12° F).⁴⁴⁶

Several important qualitative transformations have already taken place, in all likelihood reconfiguring earthly nature in a manner portending a new Earth: Gas hydrates are rapidly dissociating in Arctic waters and, especially, along the East Siberian Arctic Shelf where plumes tens to hundreds of miles long are now measurable; as much as twenty-five percentage (25%) of the Amazon forests as they existed in 1980 have now disappeared due to drought, wildfires and intentional burning for agricultural usage; a portion of the Gulf Stream currents that feed northward, those around eastern Greenland, now move due east toward Portugal as the ocean conveyor at its point of origins in downwelling has been shutdown as iceberg armadas from the melting Greenland icecap dilute the saline content of once heavier, warmer waters; overflow and flooding from rising sea levels in the Bay of Bengal has reached 60 miles inland into Bangladesh, salinating and ruining once productive agricultural lands; and across the subArctic and Arctic landmasses globally permafrost and peat bogs are rapidly melting giving rise to a wildfire "season" which, if not quite yet year round, has expanded to nine months annually (in January 2016, January mind you, eastern Sweden witnessed extensive wildfire outbreaks), as, at different moments during the past

⁴⁴⁶The "achieved" CO₂ levels are not uniform throughout the course of any given year. They generally peak in May, fall in the ensuing months and then start to climb before the year is out. An enduring feature of capitalist development, industrial emissions of all sorts, of course, guarantee they invariably rise from year to year.

The 80th parallel north latitude is 2450 miles, and the North Pole is 3100 miles, north of St. Paul at 44° latitude north.

five years, wildfire smoke has covered large parts of North America and Central Asia.

The land masses of Asia (Siberia) and North America reach as far as 75° north latitude where the permafrost runs several feet deep; but that permafrost extends discontinuously southward as far as 55° north latitude, though here it is only a few inches deep. As winter continues to die, annual snowfalls across regions in the higher latitudes have dramatically fallen and, at the same time, anomalously warm spring weather... 20° C (36° F) above historic norms in April-May... is no longer rare. These anomalously warm temperatures and the low humidities accompanying them, drought conditions, forests with huge numbers of dead trees, extremely dry undergrowth consisting in leaf litter, organic material and deadfall extending down three feet, methane rich peat bogs and swamps which, already afire, smolder right through the winter taken together create the conditions for a wildfire "season" that extends, as indicated, from March through November. Within the next two to three years, the entire northern hemisphere landmass above 55° north latitude... Alaska-Canada, Scandinavia and Siberia... will be a single mostly contiguous zone of wildfires. The smoke from this inferno belt will reach as far south as Mexico City and Havana, the Sahara, Dhaka and Hanoi, and its presence and particulate mass will compel periodic voluntary and some cases forced evacuations of inland, mid-continental cities such as Chicago and Montreal, Rome and Istanbul, and Beijing and Harbin as visibility decreases to zero and the air becomes unbreathable...

The integration of the global system of social relations grows apace: This integration more and more incorporates surrounding nature, if not immediately and directly then visibly, causally and with temporalities that are no longer geological and not even historical but occurring within the living present. For instance, while only temporary (i.e., the subordination of nature to capital is temporary) with the growing atmospheric presence of industrial CO₂ emissions and their increasing worldwide annual output, the carbon cycle has effectively now become subordinate to the movement of capital. This linkage of social and natural events together with the qualitatively increasing instability of a system in crisis, especially the global finance system, subjects human, humanly natural and natural realities – all of reality as it is given with earthly nature – to what can only be a growing ferocity of cyclical movement, of limited (both temporally and geographically) expansions interspersed if not alternating with prolonged contractions. So that the intricacy, complexity and integration of capitalist social relations worldwide inescapably suggest that the system as a global system is fragile and is becoming more and more, exceedingly, fragile as they are buffeted by growing dimensions of the changing climate, whose effects are dynamic and nonlinear. Fragility has various measures, but an ambiguous, non-social one that is indicative of the abyssal depth of crisis will be obtained as average worldwide sea level rise, once it reaches 3 cm, approaches 9-10 cm annually. At this moment, all the climate change effects in the order of society discussed earlier will become real and actual, and the subordination of nature to the movement of capital will precipitously and rapidly reverse having become irreversible...

During the entire 110,000 year humanity has existed Earth's climate has never been as stable as it has been during the past 10,000-12,000 years. No more. Moreover, there is no evidence that in the past 4 *billion* years it has ever undergone a runaway warming. Well, not yet, for it has become a real possibility. This is the situation we confront today.

Conclusion

Climate Change, Origins of "Man" and Ice Ages

The stakes in the ongoing transformation of the Earth compel us reach back to human origins, precisely because it is, for us, a sense of humanity in its evolutionary, natural embeddedness and the perspective it provides that is missing in most climate change discussions. We can conclude, then, with the relation of interglacials, hence both climate change and ice ages, to the evolutionary development of humanity. Start by reviewing the geological reconstruction of ice ages.

The average annual temperature at the surface of the Earth had been cooling slightly over several million years prior to the date we are about to provide: About 1.8 million years ago the Earth entered an epoch called the Pleistocene and in a general way known as an ice age. What this means is that there is a year round ice cover over the poles and that periodically (actually for long periods of time) the Earth undergoes a dramatic cooling in which that ice extends southward from the north pole into Siberia, European Russia, Europe (the last time it reached as far south as today's Bavaria) and over the northern half of North America, and it extends northward from the south pole over large parts of the Southern Ocean (that circles Antarctica), into Patagonia, even southern New Zealand and southeastern Australia. (The whole discussion must be stated this way because these same geological reconstructions tell us over the past 700 million years the continents have not always existed as we known them, have not existed in the same place as we find them now, and for the long stretches of geological time there has been no ice at the poles.) Starting perhaps as far back as a million years ago the ice age we have just left behind began to assume a recognizable pattern: This pattern consisted in a period of extensive ice coverage known as a glacial lasting roughly a 100,000 years. It was followed by a period of transition generally lasting a couple thousand years, and then a warming lasting about 11,000 years. In the strict sense that warming is known as an interglacial. In each case, it was followed by a lengthy period of transition leading to renewed glaciation. This shift from a glacial to an interglacial and vice versa is a genuine form of global climate change, though over the past 600 million years no such change has occurred in the radical manner we confront today. For, today we have undergone a rapid transformation which has ended geologically current ice age; and we are living through a vast transformation from a cold, dry to a hot, wet climate.

Now, if we examine the archaeological reconstructions of our evolutionary development, we can note that anatomically modern man, someone we would perceptually recognize as a human being and technically known as *Homo sapiens sapiens*, first appeared about 110,000 years ago. By anatomically, we mean she was characterized not just in terms of a two-legged creature who walks upright, but she also possessed features such as (large) brain size, a specific type of jaw and dentition, a hand in which an opposable thumb is fully developed, and so on. You would *recognize* this being as a human, but if you engaged her in discussion with a relatively complex argument, you might find her slightly dull-witted. It was about 45,000 years ago, that the features that would make your discussion with her mutually intelligible appeared. These features included systematized, articulate speech (entailing language that is self-referential, meaning that concepts which do *not* make immediate reference to visible, tactile, audible, etc., things can be produced, expressed and understood). There are several other cognitive and existential features that underline this, her development. These features need not detain us here, we have explored them elsewhere.⁴⁴⁷ There is one more archaeologically reconstructed date we would mention: It is from about 10,000 years ago, that we can mark the origins of agriculture, the appearance of the first stratified societies based on fixed positions in a division of labor, and in its most rudimentary, undeveloped form, the state.

We can, then, conclude by relating these archaeologically reconstructed dates to the brief survey of the geological reconstruction of ice ages we began with. The Riss, the second last glacial, ended about 130,000 years ago. Recall that anatomically modern man appeared roughly 110,000 years ago, that is, as the last interglacial was fully underway (and probably beginning to end). Note the Würm, the last glacial, began to end about 16,000 years ago and bear in mind that all the human, social developments associated with what we call civilization (agriculture, class society and the state) begin to appear as the current interglacial, a warm and climatically settled period, was fully underway, some 10,000 years ago. Now those last 10,000 years have been, climatically speaking, extraordinarily stable (not, for example, subject to regular, sudden and devastating occurrences of "extreme weather"), the most stable of *all* the geological periods of Earth history that have been reconstruct.⁴⁴⁸ It has been in this period, known as the

⁴⁴⁷For this, see *The Materialist Dialectic*, "The Appearance of 'Spirit'," above.

⁴⁴⁸This stability is not fortuitous (though if you are bourgeois and a scientist, you think otherwise... Ruddiman calls it an "accident"). Five thousand years ago, the Earth should have been (re)entering a glacial, cooling. But that cooling was

Holocene, that all those *contradictory developments*, from the bane of human existence... agriculture with its fixed positions in a social division of labor, stratification within the community, and the formation of the state as an organ of repression and popular regimentation... to those most exalted human achievements... a material abundance adequate to the nutritional requirements of healthy living and, with it, (long, long ago realized) adequate demographic density to maintain *Homo sapiens sapiens* as a species on Earth, a (vastly overdeveloped) built environment to sustain human life, in principle the technical wherewithal (itself in need of transformation) to provide living time to develop skills, aptitudes and practices of a high culture among masses of people... have taken place. This contradictory development has proceeded on the basis of social division and class conflict and this largely on the basis of capitalist production, and on *that* basis by way of the rapacious plundering of nature: The domination of nature is inextricably linked to and inseparable from class exploitation and, complexly mediated (i.e., secured and reproduced by the undisputed hegemony of capitalist civilization over all aspects of daily life), to various forms of oppression and bigotry which that exploitation grounds.

Now humanity has become a geological force, a force of nature, but humanity is, as we said, torn and sundered by social division: Ruling classes intent only on accumulation and organized through capitalist states are wracked by nationalist rivalries and engaged in a fierce and intensifying struggle for markets and resources, a struggle played out across the world. Kyoto, Copenhagen, Cancun, the IPCC, their "efforts" to stem the most deleterious effects of climate change, are shams, circus performances and diversions. A calamitous unprecedented, unimagined catastrophe that is now on the horizon, and the chances of averting it have now disappeared.⁴⁴⁹

There is power in nature that exceeds human mastery in any and all its forms, actual and potential. Once fully underway, climate change is one such force, and societal transformation, even revolution, should it come, will come too late.

offset by the rising carbon dioxide and methane emissions produced by agriculture reaching back five thousand more years, and accelerated by this time (3000 bce) by the rise of civilization in the medium of well-formed states, i.e., it was generated by rice paddy farming, methane emissions from livestock (belches, burps and excrement), and deforestation for planting and biomass burning. The stability is an outcome of the interplay of a natural, cyclical cooling (identified by Milankovitch) and the slow, steady increase in greenhouse gases produced by human activity beginning those 8,000 years ago, and discussed above (Part II, "Geophysiology of the Earth, V," point three in our account), or, as just stated, it is was a product of the invention of agriculture (especially monocultural agriculture), statification and the rise of ancient civilizations. For Ruddiman, *Plows, Plagues and Petroleum*, 79-80, 88-94, 95 (for the "accident"). 107-112.

⁴⁴⁹Having identified that catastrophe with a new, reconfigured "hothouse" Earth initiated by capital and driven by a runaway warming, we would simply remark that if there are stable states, if this warming does not simply end in the reconfiguration of the Earth as a dead rock much like Venus, it is not because the chemistry and physics of climate change "find" a stable state, for instance at 10° C above pre-industrial levels, but because the causation is geophysiological, i.e., that bacterial based microbial life generates and maintains these elevated boundaries within ongoing transformation. Physical causation is just more scientific garbage.

Summation and Perspective
***Why the Study of Human Origins is Indispensable to the Critique of Science
and Inseparably that of Capital***

Species determination is natural determinism.

In the gorilla and chimpanzee, we see the development of a slow movement in and through which individuality is distinguished really and in fact from the species. This movement does not, of course, reach its full development until the appearance of man and even then, it is not complete: Not as a state but as unending activity, that completion is called freedom. It cannot become actual if and until women and men as naturally social individuals have in organized forms of sociality broken with all forms of natural determinism. This determinism is concretely incarnated in hierarchy. The most general form among humans of this natural determinism, though not the only and not the oldest, is prereflectively and as a matter of course formed as sedimented behavior and institutionally solidified in relation of command and obedience as they are inscribed in fixed relations in a division of labor. It is this basis that a sphere of production (determinant for social life as a whole) arises in human history as it unfolds in nature.

Return to primate forms of life. Among primates, species determination is greatest among those species who exhibit the most rigidity in social life. These species are socially organized as a rank hierarchy on the basis of male dominance. Among mammals, the rhesus monkey and the baboon are exemplary in this regard. Here instinct and, where there is learning, habit have been fixed and rank (hierarchy) itself rendered lasting through the male led permanent group or troop. (The military connotations of the term "troop" are at once revealing and fitting.) A defining mark of this hierarchy and domination is the fact that the lead male (and in order those immediately underneath him in the rank hierarchy) have access to any and all adult estrous females. While sexual dimorphism (qualitative, gender-based differences in size, weight and strength) deepens this natural inequality and division, it is not itself natural determinism.

There is also pronounced sexual dimorphism among gorillas, but while in gorilla social hierarchy is present it is largely suppressed. For instance, the dominant male gorilla ignores the occasional squabbling and rare fights among females with their differences; while among baboons difference takes the form of socially unintegrated discord. It brings on anxiety and excitation: The dominant male baboon gestures, cries out and, if necessarily, interposes himself bodily to more quickly end fighting among ranked female baboons in order to restore order and species behaviors to the troop. Gorillas are largely peaceful, they do not engage in internal group aggressions and the male does not provoke a fight with an intruder (say, a human) or a predator preferring to scare it off, fighting only if he has no other option. These behaviors do in fact have something to do with the reality of the gorilla as an herbivore.

Exhibiting both the formation of practical intelligence and, necessarily linked to it, the slow emergence of individuality distinct from species life, the chimpanzee goes beyond the gorilla in at least two respects. First, though the male gorilla is no longer "privileged" in having sexual access to all adult estrous females and is "monogamous" mating with a single estrous female at a time (if not mating with her for life), chimpanzee males stand in line, so to speak, and wait their turns, for the chimpanzee female is promiscuous. She mates with any number of males while in estrus, and the males do not fight amongst themselves for her. Second, the troop has been dissolved in a "higher" or a species sociality which itself is not natural determination: The chimpanzee group is, as *The Materialist Dialectic* recounts, temporary, continuously forming, breaking up and reforming as adult males, older juvenile males and adult females come and go. Beyond renewing an old relation, in forgoing hostility or animosity in incorporating a stranger into the group, there is here a species recognition that goes beyond the troop, that recognizes that this or that male or female species individual is like us and can become part of the group. That this is a more universal, a species sociality is confirmed in behavior when and where different chimpanzees individuals and groups crisscross each other in space and in time (i.e., where they are simultaneously present in the same forested areas): In these conditions, chimpanzees are not indifferent, do not merely tolerate one another as groups who know the limits beyond which they do not move without provoking an aggressive response from other same species groups (as in monkeys and baboons); instead, the level of excitement qualitatively ratchets up, it is palpable (and obviously audible), as chatter among the chimpanzees dramatically increases in greeting and acknowledging the presence of one another. In this regard, it is also of greatest importance and significance to recall that gorillas as well as chimpanzees (and here they are no exception, for almost every animal society does similarly) break all over again with species determinism in their reproductive practices that ensure a population density that is far, far below the levels where their numbers would be in balance with what available food resources would sustain.

Still in the chimpanzee there is also a retreat below the level of the gorilla in its taste for meat, in the predatory theft of the infants and killing of other species forms to renew a life that already finds abundant provision in the forests...

Natural determinism is carried over in hominids and is sustained for over a thousand millennia in hunting and gathering bands that were male led simply on the basis of prowess. It reappears in human history, as the hierarchical group is reproduced across the breath of that history in various, specific forms.

With the appearance of settled social life at the outset of the current interglacial some 10,000-12,000 years ago, proto-agriculture appeared, first in the Levant. Here fish, waterfowl, small mammals, and, as new treed forms of plant life developed, fruit or seeds from plum, hackberry and medlar, and roots and tubers as well were all available to hunter-gatherers who settled into a sedentary form of life. Far and away the most plentiful and rich sources of carbohydrates, fats and protein could be found in the oaks' acorn and pistachios. But containing tannic acid, these nuts cannot be eaten ready-made: They require shelling, pounding, soaking to leach away the acid, and then cooking, to render the nut's meat edible. These are not quickly accomplished tasks, but take hours of daily labor. The tasks fell to women, effectively creating a sphere of productive activity, a gendered based division of labor.

As agriculture (i.e., grain, whether wheat, rice and later corn, agriculture) itself developed in an effort by human communities, now tied to a fixed abode, to secure stable material surpluses, this division of labor hardened and was generalized, creating stratified positions in production. This is one path, not the only one that, humanity took toward settled social life. But this is the road the larger part of humanity went down. *Remaking and transforming male dominance in the social group by integrating it into fixed positions in a division of labor, and the attending social stratification, constitutes the foundations for a new order of domination, the origins of both labor and its exploitation all of which is secured by another novel development, the state:* Once formed, agriculture and a sphere of material production created a space in which power, already long present in millennia old male dominated nomadic hunting-gathering bands, poured itself into: It was on the basis of agriculture and the reliable surpluses it generated that a struggle over those surpluses issued, a tiny stratum in the community appropriated them expropriating the producers, and the state first formed.

A lengthy historical development unfolded. Agriculture, surpluses, stratified positions in a division of labor engaged a mass of producers, and a tiny caste, stratum or class controlling and deploying a body of armed men, a state, appeared. This most condensed and abstract formulation for statist formations of all sorts and kinds, ancient and modern, is a formula for civilization.⁴⁵⁰ At the same moment, archaic communities appeared as a countermovement to the initial development of a socially determinant stratification and nascent power, the state in its most primitive, earliest shape, and in more developed form tributary civilization. Archaic communities form, disappear and form anew throughout the history of stratified social division and class societies precisely in opposition to states as they form, disappear and re-form. They constitute themselves as a historical *countermovement* because they, limiting their populations, thrive and prosper on an existing material abundance in nature, because social individuals lack an elaborate need structure and are absent egoism and the extremely individualized subjectivity raised upon it, because they refuse labor, fixed positions in a division of labor, agriculture and surpluses... property is absent in production, production as a distinctive, separate sphere of social existence is in most cases absent... but most of all because they exist in opposition to the state, to power, hierarchy and relations of command and obedience. Men still hunt, they war as war itself is constitutive of the relations between archaic communities,⁴⁵¹ above all, women can be (but are not as a rule) relegated to a sphere that bears the hallmarks of production in its early, most undeveloped form... these are the limits of those archaic communities in which men hunt and women gather. Where women are not so relegated, the separation (of hunting from gathering) constitutes a functional division of labor in which a differentiated sphere forms, *one in which both men and women participate and act*, but one that is, temporally speaking, vastly constricted. It does not congeal and form the basis of social stratification. The latter is suppressed by creating an institution of impotent power (in the personage of the chief). Archaic communities render Power powerless, because in their social bond they understand and know coercion (Power) only exists in opposition to that bond, to their sociality, to themselves. Power can only exist as the abiding presence of natural determination relentlessly and ceaselessly reforming

⁴⁵⁰This development can be characterized as tributary. See *Archaic Communities and the Origins of Agriculture* (St. Paul, 2009, 2011), "Non-Capitalist, Human Communities (Forms of Sociation) and Earthly Nature."

⁴⁵¹Among other things, warring provides captured women who are brought into these demographically thin communities as equals and take husbands. Call it an ancient recognition of the dangers of incest.

and reordering human sociality.⁴⁵² ...

Capitalism, the formation of a distinct encompassing and determining sphere of social life, an economy governed by the logic and movement of capital, the penetration of the value-form and abstract labor (and, more immediately, the bearers of this form), is the solvent of early (often kingly and tributary) oppressively exploitative, i.e., statist, formations as well as free archaic communities. Established on its own foundations (as real domination in that separate, all-determining sphere of production), *all over again capital has reorganized and transformed all the old forms of natural determination and continually reconstitutes them. This, too we repeat, constitutes a new order of domination starting from the old, remaking the various forms of the exploitation of labor based on enslavement, tribute or rents by its abstraction (recreating it as labor-power or abstract labor).*

Five integrated, overlapping areas of naturally inhuman forms of domination now appear.

First, in the unity of the labor and valorization processes, the activity of labor is contradictory: It enters a production process as concrete labor, and in those processes it is abstracted (reduced to a quantified temporality that is objectified and materialized as the "substance" of commodities, as value) and produces products over which it has no control, which confront and dominate it as an alien objectivity, in order to reproduce itself as living labor, i.e., it produces and in producing renders itself a passive object for capital. The transformation of the subject into an object for capital while remaining a subject, that is, consciously acting and producing (bringing forth something new, i.e., something not present at the beginning of the process), the transformation of the concrete into the abstract, taking shape in production is the basic form of domination in society, incorporating historically existing previous forms of domination (inequality, various bigotries and forms of exploitation), that upon which all forms of oppression are now based. It is precisely this form, the fundamental shape of domination as such, that the mystifying inversion characteristic of capitalist production conceals.

Second, the establishment of capital on its own foundations only occurs as science and technology become systematic inputs into production. This means that class exploitation is inseparable from, bound up with and reinforced by nature domination, for science, as the theoretical anticipation embodied technologically, is the domination of nature.⁴⁵³

Third, under conditions of capitalist production, technological innovation is not only the motor of capitalist development, not only is modern technology *seemingly* separate and autonomous: Hierarchical relations of command and obedience are sensuously incarnated in the construction and organization of the instruments, devices, machines and machine complexes, which together with the ensemble of procedures, methods and processes mediating our relation to nature, constitute technology.

Fourth, capitalism recreates male dominance and female subordination anew by creating a private sphere of social life institutionally separated from production, a haven against the debilitating subjective effects of waged labor. This institutionally separate sphere is the monogamous nuclear family with its narrow heterosexual eroticism. (In it, female promiscuity as it appears first in nature, e.g., in the chimpanzee and bonobo, is lost, perversely and criminally replaced only by gang rape.) Its formation and development deepen capital's stranglehold on individuals; for it, the bourgeois family, ties the individuals depth psychologically and affectively to a form of asocial sociality that cannot bear the burden of the emotional demands placed on it. It recreates that domination and subordination contradictorily, a contradiction that is exacerbated by the formal liberation of women (from this family) by direct, immediate enslavement, as abstract labor, to capital.

Fifth, capitalism inverts the natural balance (it is not given) that animal groups as demographic populations have achieved in relation to their resources in nature for reproduction. (This capitalistically created imbalance is what is ideologically inverted and projected into nature. It is Malthusian and Darwinian determinism.) This is the productivism of capital itself:

As it first forcibly appeared in European culture in the era of the first imperialist world war among industrial capitalists, among layers of technicians and specialists attached to capital and among the skilled layers of the proletariat, productivism is an ideological feature of capital itself, i.e., as the demand for ceaseless expansion of productive forces, production for production's sake and the endless accumulation of capital: It is a reflex that it's, capital's, personifications express, espouse and demand. Before it even exists on its own foundations, capital requires massive populations regimented into an armed force to defend its state, the societal institution in and through which it in its antagonistic forms and contradictory movement fashions its unity; but once it does establish itself, capital demands limitless

⁴⁵²See the Afterword, *Archaic, Agriculture and Power*, "Power and Agriculture," above.

⁴⁵³See *The Critique of Science*, the Introduction, and *Capitalism and the Domination of Nature*, both below.

population growth to feed it voracious appetite for surplus value, even as it produces a global surplus population, even as it is increasingly unable to valorize the labor-power available to it. Deep into the era of real domination, capital further requires limitless growth to provide the wherewithal, the markets, in consumption to renew itself. So that constantly, nay unendingly, and exponentially growing populations are necessarily, indissolubly tied to endless expansion of productive forces, which, in turn, is inseparable from a relentless drive to extract surplus value while infinitely reconstructing nature through technological innovation propelled, of course, by that endless population growth. Malthusianism and this mad anti-Malthusian compulsion are necessary conditions and outcomes of capitalist development itself.

In the relentless search for surplus value, the same dynamics of capitalist development have transformed earthly nature into a raw materials basin for commodity production. Occurring within the material framework of limited resources, this transformation explodes that framework... Capital presents itself as an infinite entropic process of nature conquest that can only be sustained if nature (universe) in its practical infinity is immediately accessible as a raw material hold and a sink to absorb its waste. It is not, or is only to the extent it is mediated by limited natura, the Earth itself... Plunder and despoliation (recreating the Earth as a basin of unprocessed materials at the beginning of commodity production and a toxic wasteland as a cycle is completed with commodity consumption), extensive species extinctions and climate change are its necessary outcomes as *Capitalism and the Domination of Nature* details....

Habitat destruction through industrial and infrastructure construction, and urban sprawl; destruction of tropical forests (logging, clearing, grazing) crucial to the global carbon cycle; the creation of monocultural agricultural landscapes with the accompanying, necessary destruction of integrated, humanly formed ecologies that include plant and microbiotic life crucial to biodiversity, plant and microbiotic life killed, murdered all over again, through application of herbicides, insecticides and pesticides;

the ubiquitous, pervasive entry of toxic chemicals into waterways, soils and air through industrial "accidents" (oil and chemical spills) and through manufacturing processes of products made from petroleum or various metals (copper, iron ore, tin, aluminum);

and industrial and vehicular emissions of hydrocarbons (oil, natural gas, coal), above all military vehicles of all sorts, producing oceanic and atmospheric warming generating seawaters acidification which, together with agricultural nitrogen and phosphorous runoffs, overfishing and pollution, is leading to vast regions of eutrophication and formation of dead zones, to countless and increasing marine life extinctions, and to the growth of poisonous sulfide producing anaerobic bacteria; and which at the same time is melting ice caps, thus raising sea levels, and dissociating methane hydrates which accelerates atmospheric and oceanic heating, that, in turn, portends a runaway warming.⁴⁵⁴

All these are simultaneous and ongoing developments; all result in homogenization of landscapes, a vast reduction of genetic diversity and, finally, a mass species extinction which now, in its early stages, already rivals the major ones of the deep geological past. The encompassing nature of this total crisis has compelled us... as an evolutionarily-anthropologically constituted being who mediates all its activity cognitively and theoretically... to reach back to our own origins, as these beginnings are situated within the origins and becoming of earthly nature. It is the unity of these developments, a unity grounded in the logic and movement of capital, which has generated a moment, this moment, in the history of society and civilization at which it has become possible and necessary, nay existentially vital, to grasp that we are poised at the end of two converging epochs in human and Earth history which are merging one into the other, the end of capitalist civilization (today civilization as such) and the terminus of a geological epoch portending a mass species extinction that includes ourselves as human...

Thus, capital, its movement and logic producing it as a geological force, is not merely reducing us below the level 10,000 years with the rise of agriculture, labor and production but is reversing 55 million years of evolution with none of the resources in nature that were available at either moment. Rooted climatically in two-million-year-old ice age and more specifically an interglacial, the geophysiological conditions in nature that have formed the premises of a general human emancipation are now not only disappearing, the very fate of humanity as an extant form of being hangs in the balance...

Organized, reorganized and transformed by capital, inequality, exploitation, oppression with its manifold forms of bigotry are all objectively constituted, all depth psychologically rooted in individuals. They are the contemporary forms of a prehuman past that haunts humanity: As the upsurge of strictly natural determinism that is humanly unnatural to the extent that humanity has not unmade them, they are leading us to our destruction and disappearance as a form of being in nature and the total transformation of this nature in its earthly aspect.

⁴⁵⁴For the foregoing, see *Ibid*, Part I in its entirety.

Epilogue

All European traditions, Marxism included, have conspired to defy the natural order of all things. Mother Earth has been abused, the powers have been abused, and this cannot go on forever. No theory can alter that simple fact. Mother Earth will retaliate, the whole environment will retaliate, and the abusers will be eliminated. things come full circle. Back to where they started. That's revolution...

American Indians have been trying to explain this to Europeans for centuries... The natural order will win out... It's only a matter of time until what Europeans call "a major catastrophe of global proportions" will occur. It is the role of American Indian peoples, the role of all natural beings to survive. A part of our survival is to resist. We resist, not to overthrow a government or to take political power, but because it is natural to resist extermination, to survive. We don't want power over white institutions; we want white institutions to disappear. That's revolution.

American Indians are still in touch with these realities, the prophecies, the traditions of our ancestors. We learn from the elders, from nature, from the powers. And when the catastrophe is over, we American Indian peoples will still be here to inhabit the hemisphere. Even if it's only a handful of red people living high in the Andes, American Indian peoples will survive and harmony will be reestablished. That's revolution.⁴⁵⁵

Yet those same "Europeans" continue to pursue the romance which idiotically passes for the "good life"...

from pickup trucks to smart phones. We do not sustain and amend earthly nature; instead we have remade it, no longer a fitting setting for all life, inclusive of human life:

Initially generated and pushed forward by the logic and movement of capital, now subject to its own dynamic, the wrenching movement we recognize as an ongoing transformation of Earth's climate is irreversible and will not stabilize until to a novel equilibrium (hot) state of nature has been achieved.

This is no humanly available solution, least of all the intensification of modern scientific and technological development (which as "inputs" into capitalist production have, above all else, purified the logic of capital and exponentially accelerated its movement), to this grand terminal event we, and life generally, confront. Such intensification will not merely culminate in the destruction of bourgeois civilization, the value form, the world market, the "economy" and "society," a mass species extinction and the vast human depopulation of the Earth (all which will come to pass without or without that intensification); it will not merely constitute a regressive movement to the Rift Valley and far beyond, a gross simplification of achieved intricately interconnected life forms and niches; but if that intensification is pursued to its end, it will further quicken capital's movement transforming the Earth, initiating a runaway warming which reconfigures the Earth requiring some 16-17 million years to regain geologically contemporary levels of living complexity and integration even if the forms of life will be different, utterly unrecognizable to those alive today...

Theoretical and philosophical justifications (already set forth)⁴⁵⁶ notwithstanding, personal motivation for penning this work, or one such as it, can only rest on the assumption that, in fact, at least some small fragments of humanity will still be here to inhabit the Earth, even it's only handfuls living in the Alps, Andes, Carpathians, Himalayas or Rockies where elevation somewhat moderates temperature (though no one will need to huddle around a campfire for warmth). We make this assumption. Basing ourselves on it, we can indubitably remark: Nature will be absent the resources available to humanity when it first began to emerge some two million years ago, at best a stingy and, more likely, a hostile setting in which to begin anew.

Thus, reproducing humanity may come down to swiddening drought resistant plants, scavenging the remnants of the civilization of capital, and occasional barter between small groups, when at least one of those groups that confront each other more often than not is a hierarchically organized, plundering gang, a micro-statist band, marauding individuals, a small gang of thieves and murderers themselves living off the refuse of an already collapsed, and decomposed capitalist civilization.

The only justification... it is not principled, merely projectively ex post facto... that can be offered for this situation is that in the event some of these small groups are not statified, exist without a state, without

⁴⁵⁵Russell Means, "Same Old Song." Remarks made at gathering of native peoples on US plains, 1981. Reproduced in Ward Churchill (ed.), *Marxism and Native Americans*. Boston, 1988: 29. Emphases (underlining) in original.

⁴⁵⁶ *The Materialist Dialectic*, Introduction, above.

institutionally separate Power, where power is understood in its rudimentary form, a leader with a band of

armed men, thugs and killers, to support appropriation, expropriation, robbery and murder; such egalitarian groups have made themselves integrally part of nature; they rest on the appropriation of those meager resources in a communal manner, on swiddening and scavenging, are absent private appropriation, private accumulation of wealth in whatever form...

Whatever else they are, their existence would unfold in a climate of universal fear of arbitrary, brutal destruction and murder...

Reaching back 100,000 years, as the entirety of human history and development demonstrates, existing in nature all human communities are subject to events and processes from abrupt climate change to the dramatic albeit rare planetary cosmological perturbation over which these communities simply have no control. Catastrophic natural intervention in human affairs is the limit case, but it exhibits for us the singular truth that organization of even a free human community is never the starting point for an endless development. Nonetheless, the foregoing suggests the limits at which any freedom can be realized and exist in the future. Un wa yusha wo tasuku ...



Will Barnes

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